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Contents — April 15, 1937

Where Angels Fear to Tread	33
Side Door Heating Furnaces	34
Characteristics of Industrial Drive Motors	40
Principles of Metallic Corrosion	46
Reducing Cost of Snagging and Billet Grinding	49
Views of Republic's New Offices	52
New Equipment	53
February Imports and Exports	57
Automotive Industry	58
Statistics on Metal-Working Activity	62
Rate of Activity in Capital Goods	63
Washington News	64
NEWS CONTENTS	72
Plant Expansion and Equipment Buying	113



New Industrial Literature	119
Just Between Us Two	133
Products Advertised	135
Index to Advertisers	162

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... THE IRON AGE ...

APRIL 15, 1937

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Where Angels Fear to Tread

NEWS accounts tell us that Japan is worried about price inflation; that it is experiencing labor troubles and that cost of living is mounting faster than income. If the Tokio date line had not been attached to the news item, one might have thought it to apply to the United States.

The Emperor of Japan is believed, by his subjects, to be a Divinity. Undoubtedly he shares that belief and it is not our business to question it. Yet it may be interesting to note that even though blessed by birth with these extraordinary attributes, the Emperor of Japan has never attempted to exercise one man price control. As a matter of fact, the question of price control of Japanese commodities, when and if exercised, will be in the hands of the Diet, which corresponds to our Congress.

That is where the knotty problem belongs, if it belongs anywhere, for if price inflation is to be stopped it must be stopped where it started. And in both Japan and America, price inflation has been fostered and cultivated by government, not by private industry.

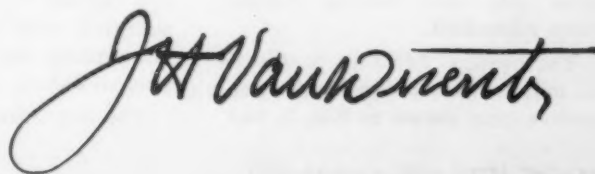
In Japan, between 1931 and 1935, the cost of government rose 50 per cent. In the United States, during the same period, it increased 75 per cent. You cannot expect prices to stay down when cost of government doubles, for the simple reason that cost of government becomes part of the cost of every business transaction and a tax, invisible though it may be, on every pay envelope.

In the United States, in addition to fostering higher prices by the profligate disregard for economy in expenditures, government has added fuel to the fire by the tacit encouragement of strikes for more wages and for shorter hours. This too is not an invitation but a command to makers of goods to raise prices or to go out of business.

In view of these facts, the President's pronouncement that activity in capital goods must be curbed as a measure against price inflation may be taken with several grains of salt. Activity in capital goods today is principally due to delayed demand piled up through five years of depression. Capital goods activity shrank during that time to 20 per cent of normal, whereas consumer goods shrank only to 80 per cent of normal.

It is a risky business for any individual, be he divine or human, to grab hold of the price bear's tail and try to steer him. The chances are that the bear will make a quick turn and bite the man at the tiller.

Price control, like charity, should begin at home.



Side Door Heating Furnaces

THE control of furnace atmosphere and pressure in batch-type heating furnaces is becoming an increasingly important problem to both fuel engineers and metallurgists. Consequently, the information contained herein is most timely. Much has been accomplished in the subsequent heat treatment after rolling, as is evidenced

by the mass of literature dealing with this operation, but practically nothing has been done until recently to properly treat the steel in ingot and slab form previous to rolling, with the possible exception of maintaining a reasonably tight furnace; otherwise, the slogan has generally been to "get them hot and get them out."

tirely above ground level, and is essentially a tight structure thoroughly insulated, having its recuperators behind the furnace and above ground; and, while taking up less space than the older reversing furnaces, every part of the furnace is easily accessible and readily checked.

Control System

The furnace is under complete automatic control, as shown in Fig. 4. The control system may be considered under three separate headings, although each of these is dependent upon the others for its proper performance.

The furnace pressure is maintained by an indicating Air-O-Line controller. The pressure is measured at a point between the center doors and about 1 ft. above the hearth through a 2-in. pipe which is led under the furnace to the control board and the instrument. To compensate for changes in temperature along the piping, a second pipe is laid parallel to the first but is open-ended at the furnace. These pipes operate two bells in the instrument, and the latter is equipped with a pointer and calibrated scale with a range of -0.1 in. to $+0.1$ in. H_2O . A change of 0.01 in. in pressure produces a pointer deflection of $\frac{1}{2}$ in.

The instrument controls a piston pilot which in turn controls a pneumatic piston operating the stack damper on the top of the stack. In order to maintain equal closeness of control regardless of the furnace load, the stack damper must be moved in much smaller increments when it is near the closed position, and in larger steps at the other extreme of its travel. A cam



THE continual demand for better steel plates at lower prices has put a greater burden on the management of steel companies. With raw material prices and metallic yield in ingot form fairly well standardized, there are only three points remaining where cost improvement can be made, namely, tons per hr., fuel per ton, and rolling mill yield. Tons per hr. is largely a question of furnace and mill facilities and correct sizes for economical rolling. The remaining two items are more flexible and responsive to research.

After ten years of more or less continuous study with both recuperative and regenerative batch type heating furnaces, working under various systems of partial control, the Lukens company decided that it was ready to recommend the installation of a recuperative side door heating furnace fully controlled.

The heating furnaces in the 84 in. mill are the conventional regenerative type shown in Fig. 1, hav-

ing a hearth length of 28 ft., a width of 9 ft. and overall outside brickwork dimensions of $39\frac{1}{4}$ x $11\frac{1}{4}$ ft.; and as the heating facilities in this mill were inadequate, it was decided to add a new furnace of the recuperative type on approximately the same floor space occupied by the existing furnaces.

The new furnace, Fig. 2, has a hearth length of 34 ft. and, width of 9 ft. and overall outside brickwork dimensions of $36\frac{1}{4}$ x $11\frac{1}{4}$ ft.; and while the outside furnace length is 3 ft. shorter than the existing furnace, it should be noted that it was possible to add 6 ft. to the length of the hearth, or an increase of 24 per cent to the effective heating space. The reason for this is easily accounted for when a comparison is made between the old and the new furnace ends, shown in Fig. 3.

The furnace was constructed by the Surface Combustion Corp., and equipped with Brown Instrument Co. control, and was put in operation on Jan. 6, 1937.

The new furnace is installed en-

(Furnace Pressure and Temperature Control)

By MARTIN J. CONWAY
Fuel Engineer, Lukens Steel Co.

in the piston pilot produces just such a condition, and pressure is controlled within 0.003 in. at all loads.

The temperature in the furnace is measured by means of four thermocouples spaced along the back wall and connected in paral-

lel to a potentiometer pyrometer controller, employing the Air-O-Line system.

The four thermocouples serve to

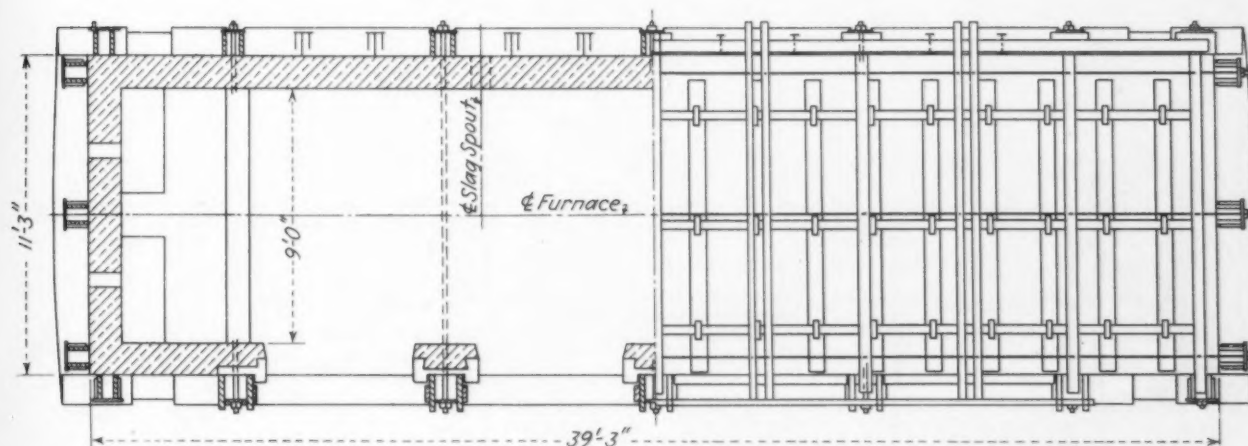


FIG. 1—The old type of heating furnaces were of the regenerative design shown here. A new recuperative furnace was built on approximately the same floor space.

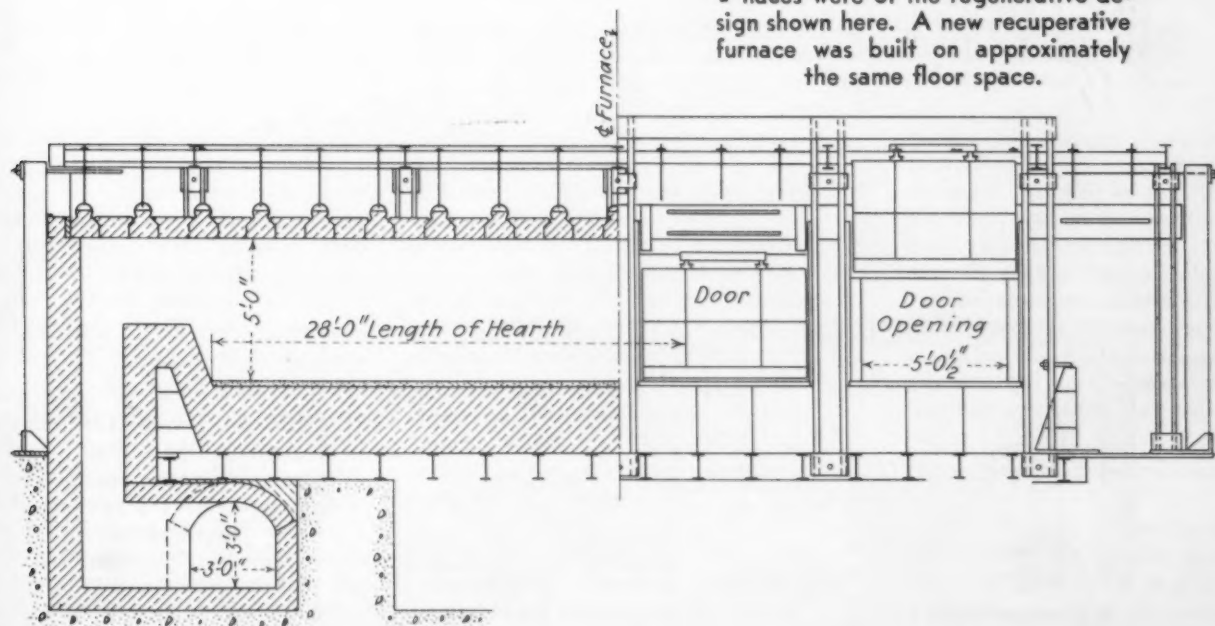
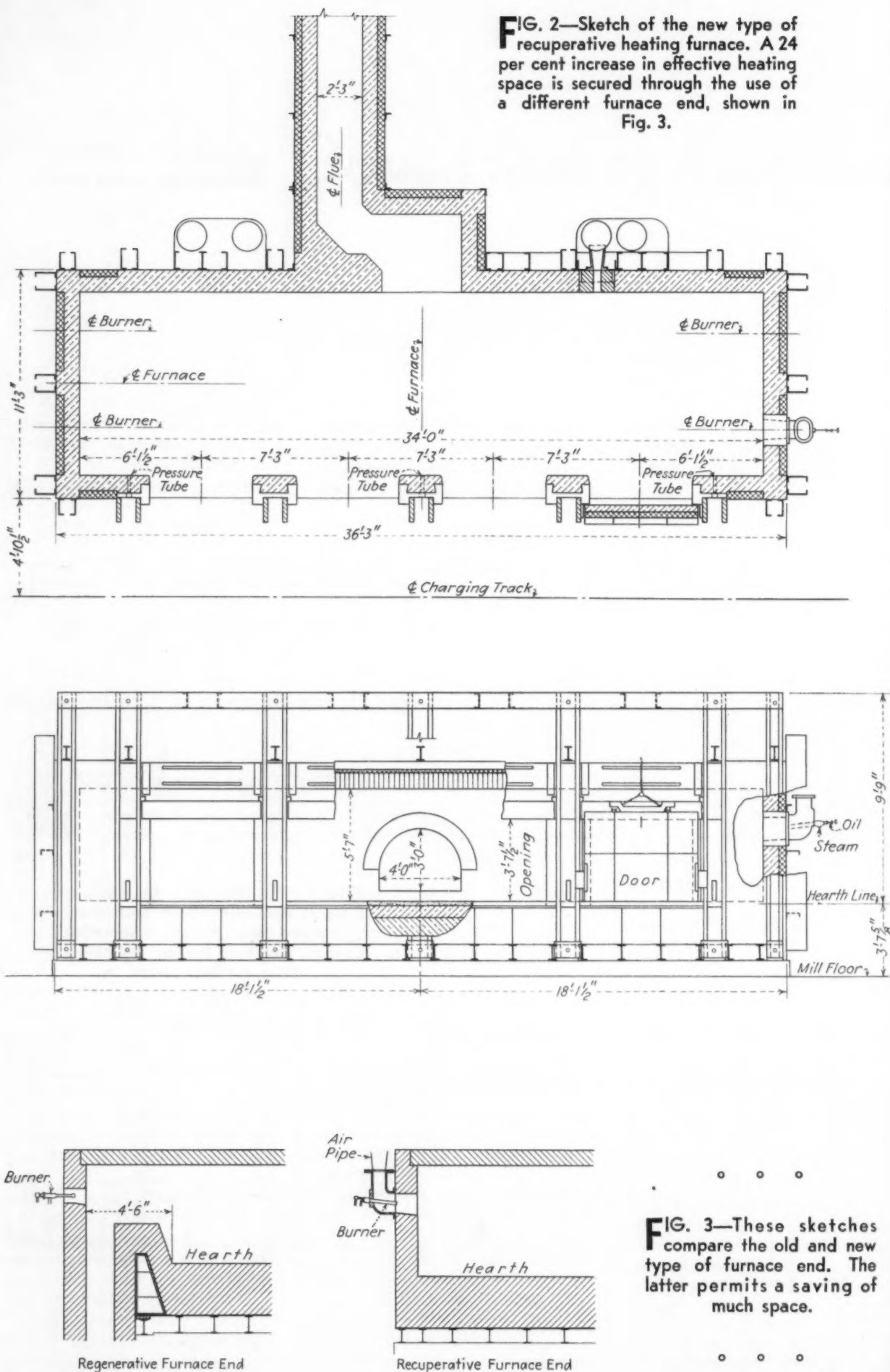


FIG. 2—Sketch of the new type of recuperative heating furnace. A 24 per cent increase in effective heating space is secured through the use of a different furnace end, shown in Fig. 3.



provide a reliable guide for the control of the furnace. A single couple would be affected mostly by the steel in its immediate vicinity and other parts of the furnace might well be overheated or underheated; but with this arrangement, all parts of the furnace are influencing the action of the temperature controller.

The pyrometer controls a diaphragm motor connected to a rotary plug valve in the oil line to all the burners, as shown in Fig. 5.

The flow of air through an opening varies directly with the area of the opening and with the square root of the pressure drop. A damper such as this does not produce uniform changes in area with equal steps of the damper, and since the hot air fan is driven by a constant speed motor, the pressure ahead of the damper increases as the damper area is reduced. The valve motion must be modified for these two variables: i.e., non-uniform damper area characteristics and variable

must be taken into consideration. These factors may conveniently be divided into three groups, i.e., conditions within the furnace, conditions outside the furnace, and the selection of the control equipment.

Among the conditions within the furnace to be considered are:—

(A) Means of temperature measurement.

How should the temperature in a furnace such as this be measured? Obviously, as the heating of the material

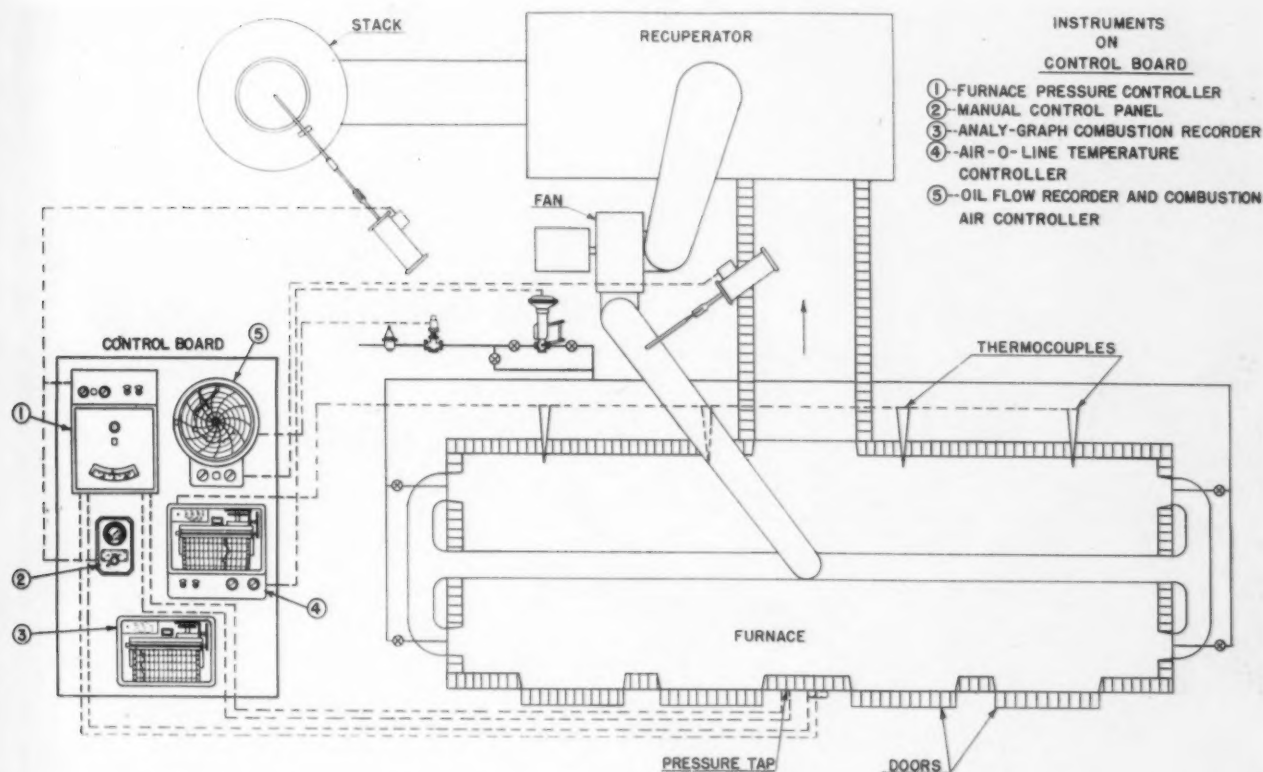


FIG. 4—The new furnace is completely controlled automatically, as shown here.

As the oil flow changes, the air flow is simultaneously adjusted by means of a semi-metered combustion control system, employing the oil flow meter on the furnace. This meter is equipped with a pneumatic system which produces a definite and linear change in controlled air pressure with uniform changes in oil flow. This pressure is then transmitted to a piston pilot similar to that used for the stack damper control. The piston, in turn, operates a circular bottom slide damper in the preheated air duct thus producing an opening of a given area in the air duct for each condition of oil flow.

pressure drops, in order to maintain the relation of oil flow to air flow in accordance with predetermined rules. This is readily accomplished by the use of a suitable cam for the piston pilot which produces non-uniform piston motion for uniform changes in the pressure from the oil flow meter.

Changes in ratio are secured by means of a dial within the oil flow meter, which can be locked to avoid tampering by some disinterested party.

Many Factors Involved

In tackling a problem of furnace control such as this, many things

within the furnace is to be controlled by an instrument, we must transmit to that instrument reliable information upon which the control can act. In such a furnace also, the temperature distribution is likely to be uneven, especially as the furnace is approaching peak material temperature ready for soaking.

(B) The method of pressure measurement.

The selection of the point of measurement. It will obviously make a great deal of difference whether the pres-

sure is measured at the hearth, at the roof, or at the stack.

(C) The method of atmosphere measurement.

Should a complete continuous analysis be taken of the furnace atmosphere, or should infrequent or analyses be taken?

(D) The burner arrangement.

For necessary control of fuel, it is not simply neces-

(B) The temperature and nature of the oil, such as viscosity, fire, and flash, etc.

(C) The pressure of the steam and oil, and the variations therein.

(D) The fan characteristics of the preheated air.

(E) The stack characteristics.

(F) The physical location of fans and dampers.

The selection of the equipment is a matter to be given considerable thought. It is necessary to

trol including furnace pressure control, temperature control, and atmosphere control.

Pneumatic controls are used throughout, in spite of the general dislike which has existed for this type of material in the steel industry for many years. This decision was passed largely because of the simplicity, flexibility, and ease of maintenance of the equipment available.

Instrument companies have pro-

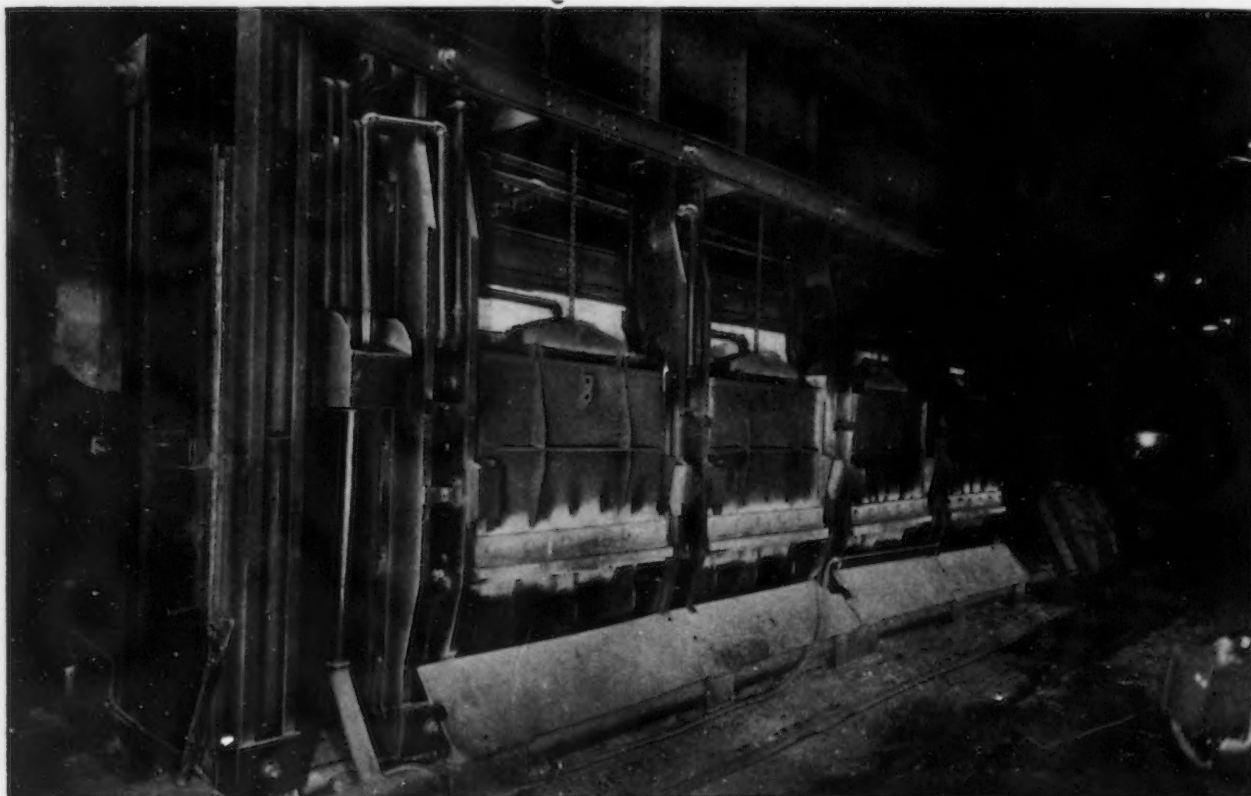


FIG. 6—An outside view of the new recuperative furnace in operation. Oil consumption is reduced 8 gal. per ton of mill product, and there is much less scale loss.

sary to install a control valve somewhere in the fuel line and hope that the single valve control will accomplish the results desired. Most burners are controlled by individual valves directly at the burner; however, they are not designed primarily with the idea of maintaining a common supply to all units.

Passing now to the conditions outside the furnace, we must consider the following:

(A) The temperature of the preheated air and its effect upon the control.

consider (a) reliability, (b) simplicity, (c) accuracy, (d) flexibility, (e) maintenance required, and (f) cost.

At Lukens the cost is placed as the last item in this list, because defects of the equipment in the other factors named may materially reduce the return on the investment. It is better to have a complete job without being wasteful than to attempt to be economical and have incomplete control.

In the consideration of these factors, the conclusion was reached that the furnace should be provided with complete automatic con-

gressed a long way from the early days when most fuel engineers were having their first experience with air control. The accuracy of equipment of this type can now be depended on; the reliability is generally considered as superior; and the maintenance required is comparatively small.

While the operation of the furnace is new to the mill heaters, the Lukens company has been able to reduce oil consumption consistently until it is now 8 gal. per ton of mill product below the conventional regenerative furnaces. Even better results are anticipated.

This performance is attributed equally to recuperators and control. In addition, it has been found possible to substantially reduce metallic furnace losses due to scale, which is almost entirely a function of furnace control.

An outside view of the new furnace in operation is shown in Fig. 6.

Scaling of metals is the result of oxidation of some metallic element or elements in a metal alloy

oxygen and a high carbon dioxide content in the furnace gases is most to be desired.

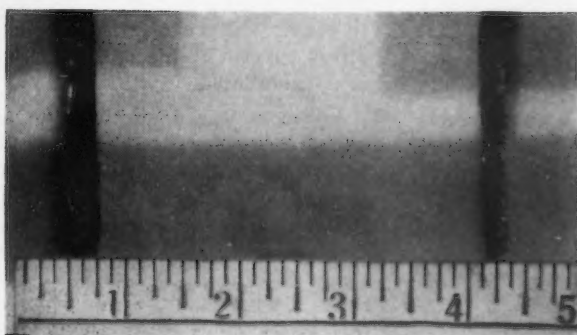
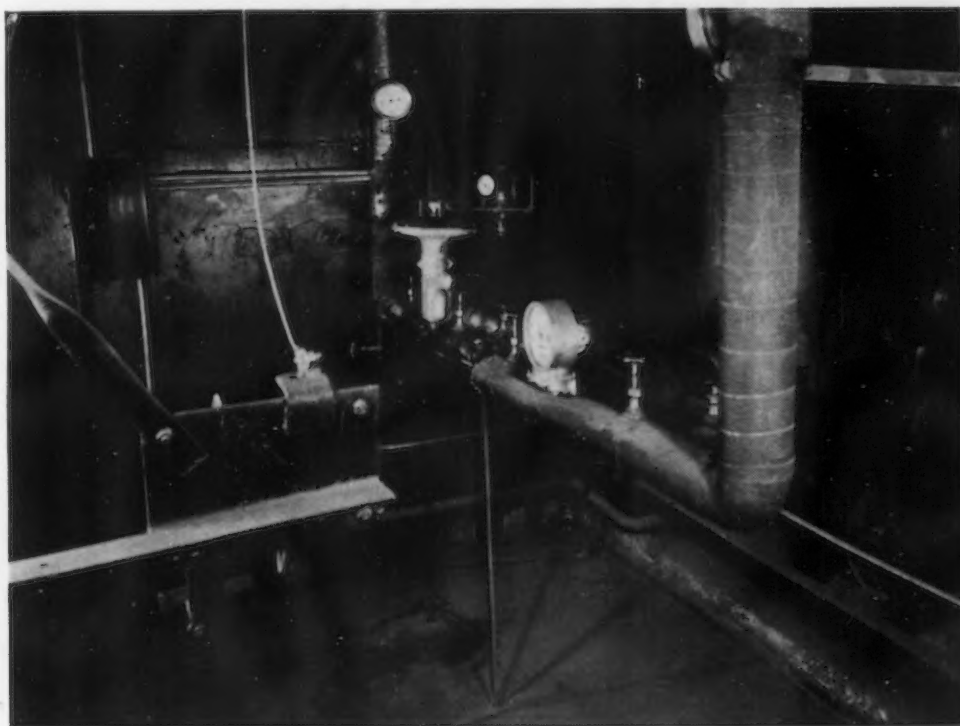
In actual practice it has been found that it was neither economical nor desirable to maintain a neutral or reducing atmosphere in the furnace, as measured by flue gas analysis leaving the furnace. The two terms are used here as a combustion engineer uses them.

With bunker "C" oil as the fuel, the most economical CO₂ content

to govern its thickness and density, so that a thin heavy scale which readily breaks away from the ingot is obtained instead of a thick porous scale which has a tendency to cling to the ingot or slab. Regarding this scale weight, or as it is termed "furnace loss," repeated tests have shown it to be at least 25 per cent less by the controlled recuperative furnace, or about 1 per cent increase in metallic yield from the ingots heated in this furnace. A comparison between the

AT RIGHT

FIG. 5—A pyrometer controls a diaphragm motor connected to a rotary plug valve in the oil line to all the burners. The view here shows this arrangement.



AT LEFT

FIG. 7—The scale weight, or furnace loss, is about 25 per cent less with the recuperative furnace. A piece of regenerative furnace scale is on the left, and a scale section from the new recuperative furnace is shown on the right.

two types of scale is shown in Fig. 7.

During the week ending Jan. 30, the mill rolled 1532 tons which was heated in three furnaces, one being the recuperative furnace. According to a preliminary study of the defects by furnaces, including both open hearth and mill defects, it was shown that of the 5.67 per cent total defects the recuperative furnace produced 16 per cent less defects than the regenerative furnaces.

It is not thought that ultimate success has yet been attained, but already sizable economies both in fuel and mill yield have been secured, the steel has been given a better "treatment" during the heating process, and at the same time the heater's job has been made a lot more pleasant.

by a gas or gases present in the furnace atmosphere.

It has been stated that air, water vapor, and CO₂ when present in the furnace atmosphere are active oxidizing agents in the order mentioned. This being the case, it can be assumed that absence of free

seems to be from 11 per cent to 13 per cent; this provides the best fuel rate per furnace hour with no noticeable increase in scale thickness.

While it is desirable to limit scale thickness, it is not necessary to eliminate it entirely, but rather

Characteristics of Industrial Drive Motors

By FRANCIS JURASCHEK
Consulting Editor

THE selection of the right motor for any industrial drive depends upon the performance characteristics of the motors available as well as upon the load. A concise resume of the electrical and mechanical characteristics of the principal types of industrial motors is presented here.



INDUSTRIAL electric motors may be broadly classified in three ways; with respect to the type of current used, with respect to their speed, torque and other operating characteristics, and with respect to mechanical features of their construction.

The first classification is simple. There are but two types of current; direct and alternating. The latter may be broken down further into several subdivisions, as single phase and polyphase, and according to the number of cycles of alternation. But single-phase current is not widely used, and almost never for ratings exceeding 15 hp.;

two-phase current is something of an oddity today, while three-phase is extremely popular. Likewise, 60 cycles is practically standard in the United States, so that for most purposes the choice in modern industrial usage is either direct current, or three-phase, 60-cycle alternating current, according to the available supply.

Direct current motors are particularly adapted for drives which require continuous operation under fairly constant loads, such as fans, blowers, line-shafting, etc., and also on certain types of machine tools where extremely fine speed adjustment is essential. Drives which run continuously at constant speed may be powered (when the choice of current is optional) with either d.c. or a.c. motors giving closely parallel performance. For most other drives the characteristics of d.c. motors differ from those of a.c. motors to a greater or less degree. Direct current motors are capable of a wide range of speed control and offer a wide selection of inherent performance characteristics. Alternating current motors are inherently single speed machines, and are quite definitely restricted to best performance at synchronous speeds (that is, revo-

lutions per minute which are direct multiples of the number of cycles of alternation). The extensive use of a.c. motors is, of course, due to the fact that alternating current is more commonly available than direct current. About three-quarters of all industrial motors are of the a.c. type, but where certain factors of adaptability and extremely flexible control are essential, it may be highly desirable to convert alternating current into direct current if the direct current is not available.

Voltages in d.c. motors for industrial use may be 115, 230 or 500 volts. For a.c. motors the corresponding voltages are 110, 220, 440 and 550. Alternating current motors above 100 hp. are sometimes used in 2200 and 6600 volt ratings, where it is desired to avoid the losses in and costs of step-down transformation.

The second classification of motors (by electrical operating characteristics) is much more complicated, and must be made separately for the direct current and the alternating current groups. For d.c. motors used on industrial drives the types may be listed as shunt, series and compound windings. For a.c. motors the types

are squirrel cage induction, wound rotor induction, multispeed induction and synchronous.

Direct Current Motors

With regard to speed characteristics, constant speed and adjustable speed d.c. motors are usually shunt wound; varying speed motors are series or compound wound.

Shunt wound: The field and armature circuits are connected in parallel in a shunt wound motor; that is, the positive terminals of each are connected together and likewise the negative terminals of each are joined, causing the current to flow through both circuits parallel to each other and simultaneously. The shunt wound motor is particularly well adapted for the majority of constant-running machines with uniform loads, such as centrifugal fans. The adjustable speed shunt wound motor, controlled by a field rheostat, gives a steady speed at any rheostat setting over a very wide range.

Series wound: In the series wound motor the field and armature circuits are connected in series; that is, the negative end of one winding is connected to the positive end of the other, causing the current to flow continuously through one circuit after the other. The series wound motor runs at slow speed with high torque on heavy loads, but higher speeds on lighter loads; thus fitting it particularly for duty involving frequent and severe starting or reversing under high torque conditions, as in railway and crane hoist service, and on rolling mills. In small sizes it is started frequently without resistance, where the load will naturally restrict the speed, as on fan drives. It will run away if all load is removed, however, and therefore should not be used for belted drives or in any situation where by throwing out a clutch the load may be removed.

Compound wound: This type of motor employs two separate field windings, one of which is connected in parallel with the armature circuit, and the other in series with it. The compound wound motor is generally used for special purposes. Gordon Fox, in his "Electric Drive Practice," lists these as follows:

To secure high starting torque per ampere input, as for hard starting or high inertia machines.

To obtain a drooping speed characteristic, as in a flywheel.

To improve speed regulation and commutation where voltages are subject to fluctuations, particularly with drives having considerable inertia, as in mine or electric railways.

To maintain uniform speeds, as in service involving starting, stopping and reversing, where stated speeds must not be exceeded when running lightly loaded.

To secure a slow-down effectively in connection with constant-speed running.

To secure a series characteristic in connection with dynamic braking.

To secure a drooping speed characteristic when motors are to be operated in parallel.

With regard to the efficiencies of d.c. motors, a comparison of efficiency-load curves of typical motors indicates that the shunt-wound motor has about the same efficiency at all speeds, whether used in constant-speed or adjustable-speed drives; the series wound motor has a lower efficiency than the shunt motor, particularly when well loaded (this is not a great disadvantage since the series motor

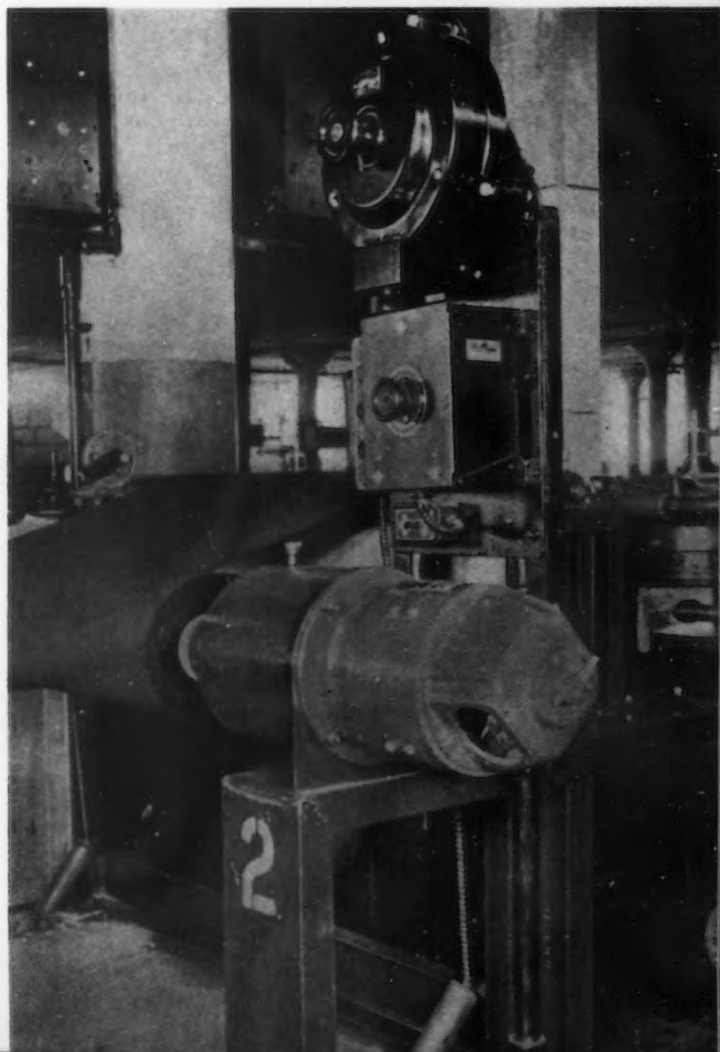
is used primarily for intermittent service, with frequent starting and stopping, rather than on continuous running drives); and the compound wound motor has a slightly higher efficiency than the shunt motor at loads up to somewhat over full load rating, whence the efficiency drops below the shunt motor.

Alternating Current Motors

About 90 per cent of all a.c. industrial motors are of the squirrel cage induction type, with a constant speed characteristic closely paralleling that of the shunt wound d.c. motor. The polyphase squirrel cage motor finds a broader application and more extensive use throughout industry than any other type of motor chiefly because it is inherently the simplest type of motor, with excellent operating characteristics when running at constant speed and fairly well loaded. The combination of mechanical simplicity and desirable operating characteristics results in outstanding reliability and low maintenance.

Squirrel cage induction: This is an induction motor (a motor in which there is no electrical connection between primary and second-

o o o
GENERAL ELECTRIC d.c. series wound gear motor driving cloth batcher in a textile mill. A wide range of speed regulation is available, controlled by field rheostat, to keep tension uniform as the cloth winds up on the roll.
o o o



ary circuits) with the secondary, or rotor circuit consisting of conductors mounted in slots and permanently connected together at both ends of the rotor. Speed regulation of about 5 per cent from no-load to full load is possible; starting torque is limited except in special types, and usually high starting current is required. Ef-

normal torque-low starting current type, the high torque-low starting current type (which should not be applied to centrifugal devices but which is especially adapted for reciprocating pumps and for compressors) and the high slip type, developing a maximum torque up to 300 to 400 per cent of full load and adapted particularly for use

tageously with flywheels on the other.

For service requiring fairly high torque over a wide range of speeds, the double squirrel cage motor may be used. This has a high resistance, low reactance cage close to the rotor surface, and a low resistance, high reactance cage embedded underneath. The surface

Characteristics of Standard General Purpose Motors

TYPE	SPEED CHARACTERISTIC	STARTING DUTY	MAXIMUM TORQUE	REMARKS
D.C. shunt wound, constant speed.	Constant, close regulation. 25 per cent increase in speed by means of field control.	Medium.	Limited by commutation.	Suitable for constant speed drives involving no special conditions.
A.C. polyphase squirrel cage induction.	Constant, close regulation.	Medium.	175-250 per cent of full load.	Simplest and most widely used motors made. Suitable for constant speed drives. Poor power factor at light loads. Poor power factor in low speed motors.
A.C. single phase induction.	Constant, close regulation.	Heavy.	165-200 per cent.	Will accelerate practically any load they will start.
A.C. synchronous.	Constant. Frequency determines regulation.	Medium.	150-250 per cent; depends on excitation.	Suitable for constant speed drives infrequently started, where starting duty is moderate. High power factor. High efficiency. Close speed regulation. Best at speeds less than 500 r.p.m.

Characteristics of Standard Special Service Motors

TYPE	SPEED CHARACTERISTIC	STARTING DUTY	MAXIMUM TORQUE	REMARKS
D.C. shunt wound, adjustable speed.	Adjustable, close regulation.	Medium.	Limited by commutation.	Suitable for machine tool and other services requiring finely adjustable speeds.
D.C. series wound.	Wide speed regulation. Must be geared to load.	Very heavy.	Limited by commutation.	Suitable for heavy and frequent starting, as in hoists and similar service.
D.C. compound wound.	Constant, 25 per cent regulation.	Heavy.	Limited by commutation.	Suitable for flywheel loads, and loads fluctuating widely, less than 25 times per min.
A.C. wound rotor polyphase induction.	Constant adjustable-varying, depending on type of control. Close regulation at full speed.	Heavy, depending on type of control.	175-250 per cent.	Suitable where frequent and heavy starting is required, where low starting current is imperative, or where adjustable-varying speed is desired.
A.C. high resistance polyphase squirrel cage.	Constant, wide regulation.	Heavy, but at not too frequent intervals.	250 per cent.	Suitable for use with flywheels to care for high peak loads occurring less than 25 times per min.
A.C. polyphase double squirrel cage.	Constant, close regulation.	Heavy, but at not too frequent intervals.	200 per cent.	Suitable for starting on full voltage with moderate current inrush, and good torque.
A.C. multispeed polyphase induction.	Squirrel cage, constant; wound rotor, constant or adjustable-varying.	Medium.	200 per cent.	Suitable where fixed selected speeds suffice.

(Adapted from Gordon Fox and General Electric Co.)

iciency in general is good at full load or nearly full load, but drops off rapidly at partial loads. Power factor is low at partial loads, particularly for low-speed motors. However, for the continuously running drive which can be held uniformly near full load, it is by far the most practical motor, all things considered. Squirrel cage motors are usually of the normal torque-normal starting current type, the

with flywheels, to care for high peak loads that occur less than 25 times per minute.

For service requiring high torque and intermittent duty, with two to three times the speed regulation possibilities of the standard squirrel cage motor, a high resistance cage winding may be added. This high resistance squirrel cage motor is suited to elevator service on the one hand, or may be used advan-

cage gives high torque at starting, while the lower cage gives good torque and good speed regulation during running, especially near synchronism.

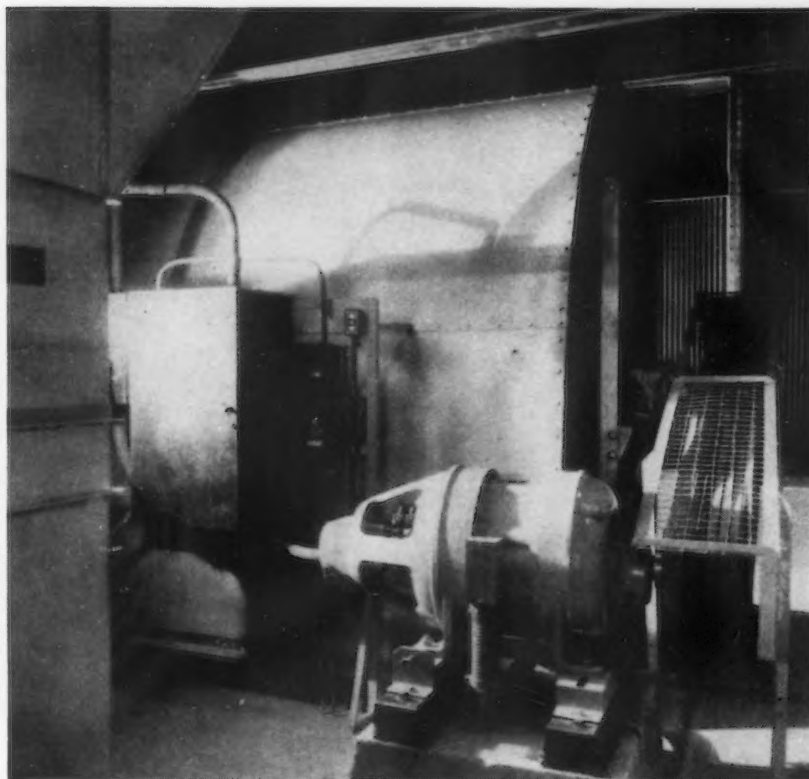
Wound rotor induction: The wound rotor induction motor employs a polyphase winding of insulated conductors in the rotor with terminals brought out to collector rings. Like the compound wound d.c. motor, it is a special

duty machine, and is adapted to frequent or severe starting, or where it is desired to minimize line disturbances in starting. It develops high starting torque per ampere of input current; it may be used to obtain a small degree of speed regulation and control of uniformly loaded machines such as centrifugal pumps and fans; and although inferior in electrical characteristics to the d.c. motor, it can be used, with manual control of secondary resistance, for such drives as crane hoists, mill tables, and industrial railway engines. In the larger sizes, with adjustable secondary resistance, it is used successfully on flywheel applications.

Wound rotor induction motors may be of the non-adjustable speed type, with resistance inserted in the rotor circuit for starting purposes only for control of starting torque and current; of the adjustable speed type, with resistance in the rotor circuit for both starting and control purposes for applications requiring speed reductions down to 50 per cent of full load speed; and of the multi-speed type, with two windings in both stator and rotor for adjustable speed applications ranging up to 4 to 1.

Multi-speed induction: The multi-speed motor is a special type of induction motor with stator windings connected to two or more poles for a number of synchronous speeds, and the rotor either cage type or wound; giving the same hp. at different speeds, or developing constant torque with higher hp. ratings at the higher speeds. Such motors are used where two or more running speeds will serve instead of an adjustable speed drive, as on elevators and skip hoists, where high speeds are required for running and low speeds for making landings. Increasing developments of this type of motor are being made for many special applications.

Synchronous motors: The stator of a synchronous motor is similar to that of an induction motor, but the rotor contains laminated poles mounted on its periphery, excited by direct current, and causing their flux to correspond with the revolving magnetic flux of the stator, carrying the rotor around with it without slip. For the purpose of starting, the rotor is provided with a squirrel cage or damper winding, which causes it



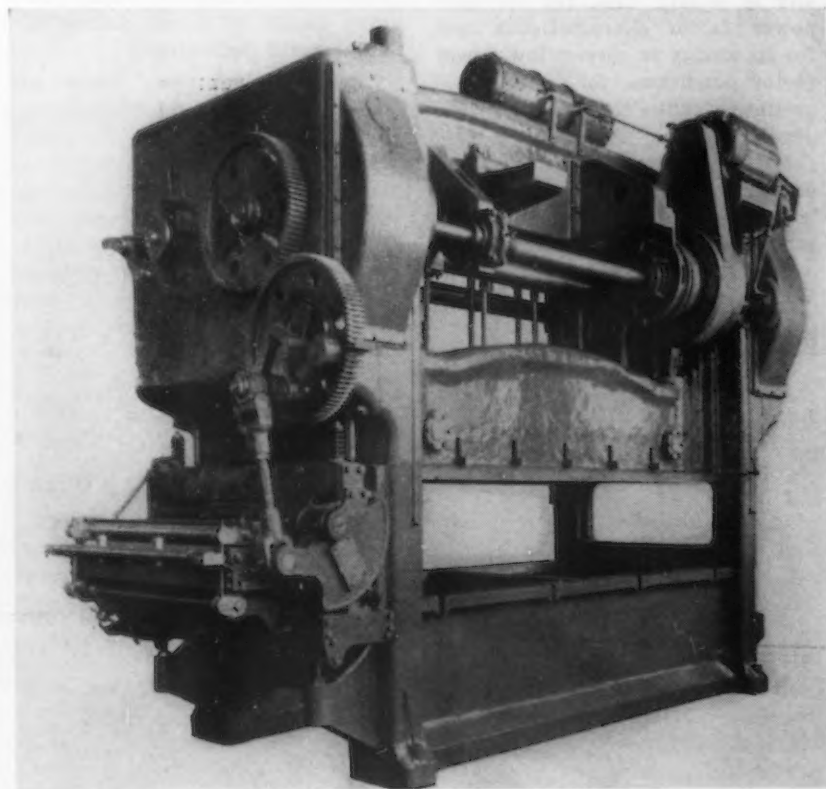
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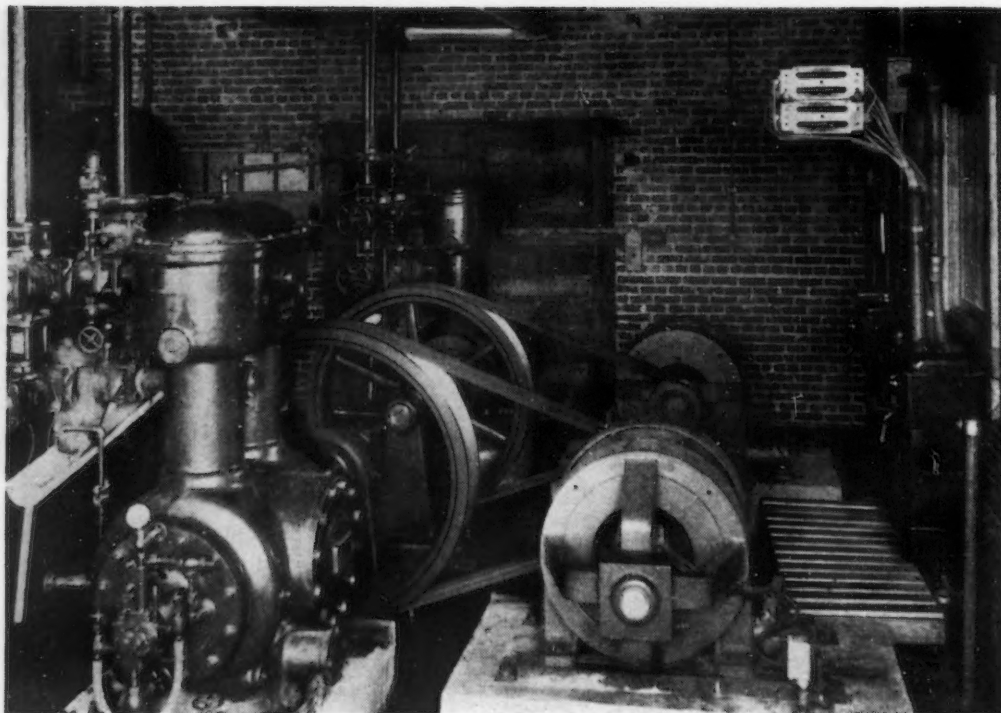
LINCOLN ELECTRIC 40-hp. a.c. slip ring motor driving large ventilating fan. Such a motor provides a happy combination of low starting current with adjustable speed characteristics.

o o o

BELOW

WAGNER ELECTRIC 20-hp. a.c. high slip, high torque polyphase squirrel cage motor driving a punch press. This type of motor is especially desirable for flywheel loads where power impulses occur less than 25 times per minute.





• • •
LINCOLN ELECTRIC 50-hp. slip ring a.c. induction motors driving ammonia compressors in a cold storage plant. This is fairly severe service, due to the rapidly recurring shock loads of the compressors.
 • • •

to come up to 95 to 98 per cent speed without excitation, as in an induction motor. When the rotor fields are then connected to the d.c. excitation supply, the rotor pulls into synchronism ("syn", same; "chronos", time).

The synchronous motor is adapted only for constant speed drives where starting is not too frequent, and is widely used for its high power factor characteristics and for its ability to correct low power factor conditions, for, with over-excitation of the rotor fields, it will develop leading power factor. Because of this ability it is often advisable to select an over-size motor to obtain the maximum advantage as a synchronous condenser for power factor correction. Modern synchronous motors have starting characteristics which are more satisfactory for general in-

dustrial use than most squirrel cage induction motors.

Special Types of Motors

With regard only to electrical characteristics many variants of the above described standard motors are available for special purposes. It is impossible to list them all within the confines of this paper, but among the more important should be noted, among a.c. motors, the following:

Repulsion-induction: These are motors having a field winding connected to the source of supply and a rotor with two windings; the outer one connected to a commutator having brushes which are set at an angle to the axis of the stator winding and short-circuited when the motor comes up to speed, and an inner squirrel cage winding which is permanently short-cir-

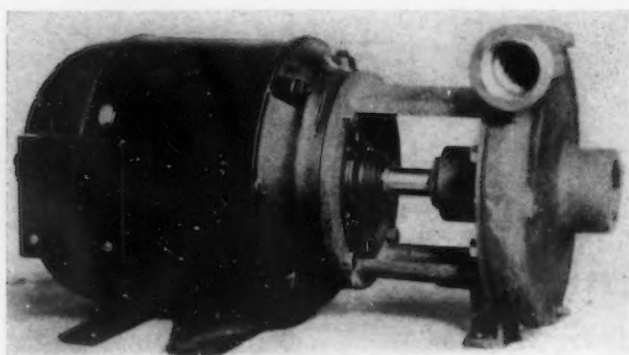
cued. This is used for single-phase applications requiring high starting and accelerating torques. Reversing may be accomplished by reversing the brushes.

Automatic start squirrel cage: These motors start with a high resistance rotor winding on low current, then automatically change to a low resistance rotor winding with normal squirrel cage characteristics. They are adapted for full-voltage across-the-line starting.

Separate winding squirrel cage: As the name indicates, these motors have separate windings for each motor speed desired, and are used for multi-speed requirements. They may be of constant horsepower-variable torque type, of variable horsepower-constant torque type, or of variable horsepower-variable torque type.

Consequent pole squirrel cage: These motors have stator windings, each of which produces two speeds. The general characteristics are in the main similar to those of the separate winding squirrel cage motors.

Synchronous motors are usually of the salient pole type, in which the rotor has four or more individual or salient poles around its periphery, excited from direct connected exciters or from a separate d.c. source. But important variations are as given herewith.



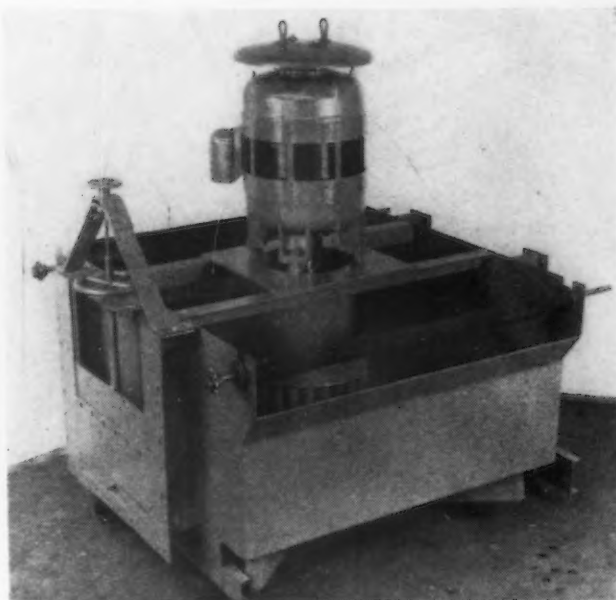
WAGNER ELECTRIC d.c. 32 volt compound wound heavy duty 1/2-hp. motor driving a centrifugal pump used for the circulation of ice-water in the air-conditioning system of railway cars.

Cylindrical type synchronous: This motor has a two-pole winding embedded in slots in a cylindrical-shaped rotor, the starting winding consisting of copper strips in the slots. It is used where high pull-in torque is required.

Polyphase-starting, self-exciting synchronous: In this type the stator carries two concentric windings and the rotor has both a.c. and d.c. windings. Primary a.c. current is brought in through slip-rings, and the generated d.c. current is carried to the field windings through a commutator. In starting, the motor is connected to the line and resistance is cut out of the secondary circuit in progressive steps until synchronous speed is reached. Then one phase of the secondary carries direct current and the other phases are short-circuited upon themselves, carrying no current while the motor is at synchronous speed. This type of motor has a 150 per cent starting torque at 150 to 200 per cent starting current. Between pull-out torques of 150 per cent to 250 per cent of full load, the motor will operate as an induction motor. It may be operated successfully at other than synchronous speeds.

Polyphase damper-starting synchronous: This has a damper winding in the rotor consisting of the usual single bar per slot connected to form a polyphase winding similar to the secondary winding of a slip-ring induction motor. Ex-

o o o
CROCKER-WHEELER
 a.c. polyphase squirrel cage motor of the vertical type, driving a flotation machine. Constant speed, little regulation available. From the electrical point of view this is a simple type of motor.
 o o o



citation is from a separate exciter or from an outside source. It is used where high starting and pull-in torques, with limited starting currents, are desired.

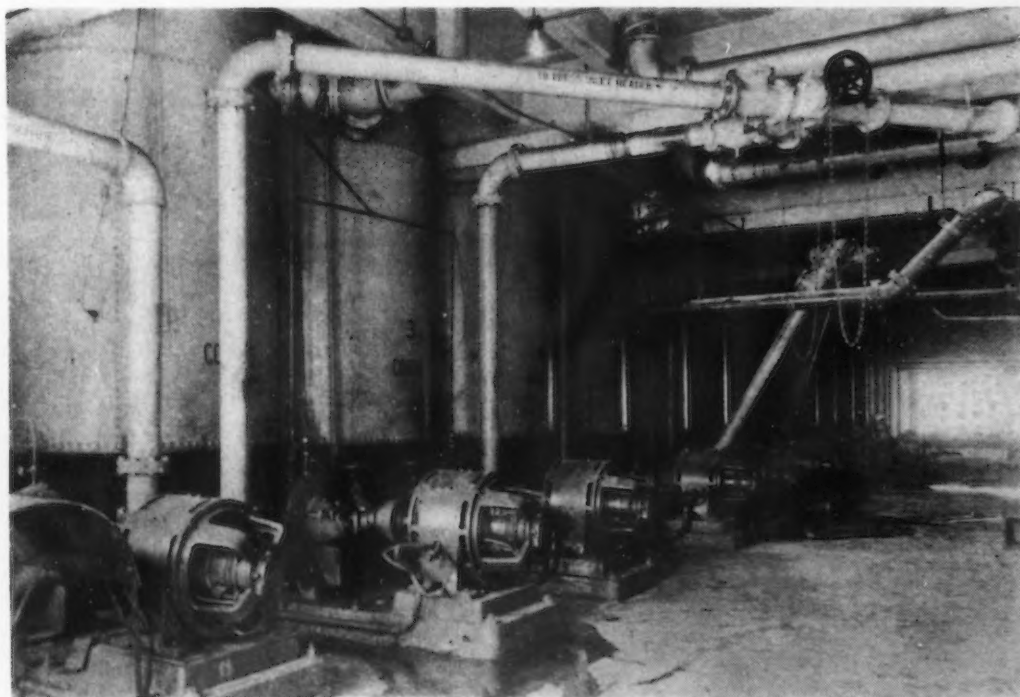
Revolving stator synchronous: This type has the stator so mounted that it can revolve while the rotor and load are at rest. The free-starting stator is brought up to speed in a reverse direction, then a large brake-band around the outer surface of the stator is gradually applied, the rotor starting as the stator slows down. When the stator stops the rotor is at synchronous

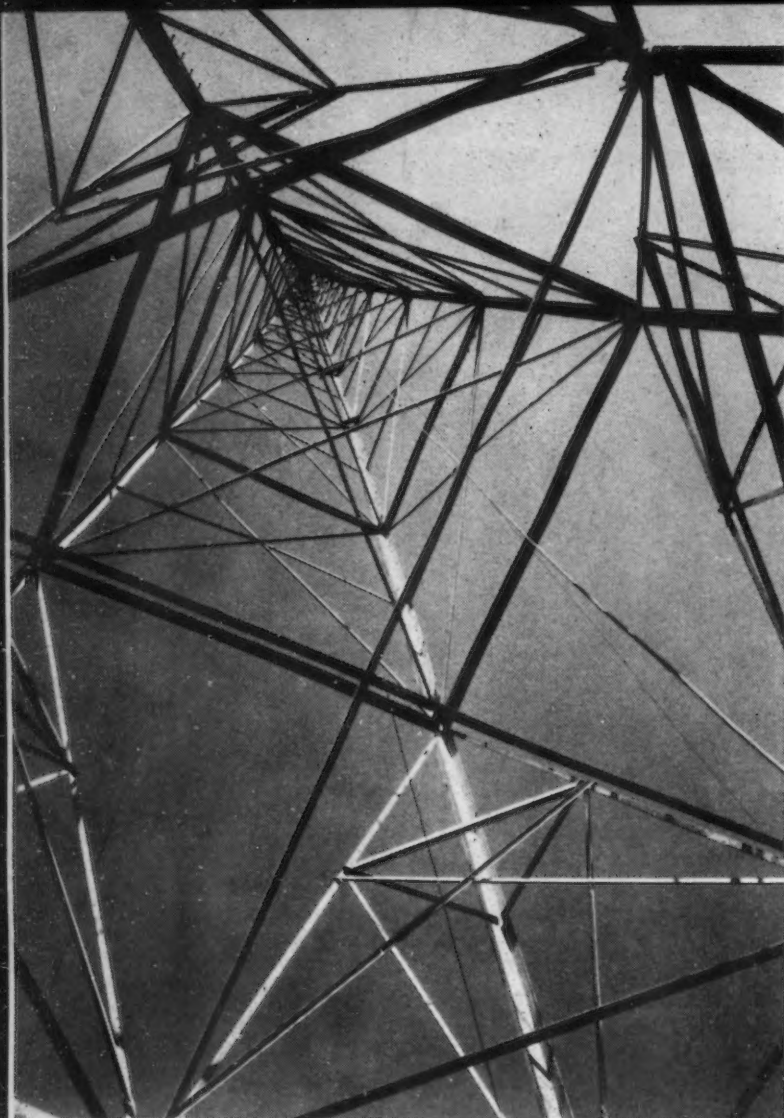
speed. Excitation is from an outside source. This motor is used for very heavy starting duty with limited starting currents. Full pull-out torque is available for loads.

Two-speed synchronous: This is a salient pole motor provided with a means of re-grouping the stator and rotor poles, and is excited from a separate source. It is used where two speeds are required, as in many reciprocating pumps, fans, etc.

Capacitor motors: Certain types
 (CONTINUED ON PAGE 115)

o o o
CROCKER-WHEELER
 d.c. shunt wound constant speed motors driving centrifugal pumps. Such motors are ideal for drives involving medium starting duty and operation at constant speed with no special conditions.
 o o o





Fundamental Principles of Metallic Corrosion

By U. R. EVANS

University of Cambridge, England

THE most obvious method of preventing this radio tower from corroding would be to paint the steel with a coating that would entirely exclude all corrosive moisture or gas. However, most ordinary paints do not act in this manner, inasmuch as cracks or imperfections usually appear shortly after application. For this reason, most paints contain an inhibitive substance which causes corrosive reactions to be stifled in the opening stages. Photo by Bell Telephone Laboratories, Inc.

WHAT are the types of corrosive attack on plain steel, with or without mill scale, with or without paint, special chemical films, or protective plates of other metals? These questions are answered in detail by the author in this article. The en-

tire fascinating subject of corrosive attack and prevention is reviewed, investigations on the subject now under way are described and, in several instances, mention is made of what may be expected in the future to increase the life of plain and alloy steels.

then the attack, which would otherwise become slower as the scale thickened, will proceed unabated.

These matters are of the utmost importance to engineers, but it is not proposed to discuss them further. It may be mentioned, however, that the thickness of the scale produced depends upon both the time and temperature of heating. Of these two factors, the temperature may be said to exert the greater influence.



ONE of the simplest types of corrosion is the scaling that metals undergo when exposed at high temperatures to oxidizing gases. The gaseous products of combustion of most fuels, containing carbon dioxide or water vapor, oxidize an iron surface appreciably, even if free oxygen is absent. If

free oxygen is present, the attack is greatly enhanced, while if sulphur compounds are also present, the scale is physically different and less protective permitting the oxidizing gases better access to the metal so that the attack is facilitated. Furthermore, if the metal work is subject to bending, scraping or to fluctuating temperatures,

Most important cases of low temperature corrosion require the presence of water, or at least moisture. In atmospheric corrosion, however, the presence of definite droplets is not in general needed. If the humidity exceeds a certain critical value, appreciable attack sets in, and below this value, corrosion is unimportant. The critical

humidity, which has received much study, is probably the value above which the corrosion product can absorb sufficient moisture from the air to maintain the corrosion reaction. Intermediate between atmospheric corrosion and immersed corrosion stands the corrosion produced by small drops resting on a metallic surface. Imagine a sheet of iron abraded in air, and exposed to dry air for perhaps a day, so that an invisible air-formed film carrying innumerable holes of different size, extends over the surface. This invisible oxide is partly formed during abrasion, when intense heating may be momentarily and locally produced it is very unevenly distributed and highly discontinuous, but becomes more continuous with exposure to air, although never attaining the protective qualities of the film on stainless steel.

Now suppose that drops of pure water are placed on the surface in air. First consider a drop containing dissolved oxygen which rests on an area containing a large hole. At the hole, the oxygen will quickly produce the lowest oxide of iron in hydrated form, namely, ferrous hydroxide. This is appreciably soluble, and if produced with sufficient rapidity will diffuse upward and meet a further supply of oxygen out of physical contact with the metal, where it will yield the higher ferric oxide in hydrated form. The latter oxide is less soluble and is commonly known as brown rust. If formed as a loose body out of physical contact with the metal, it will not be protective and the attack will continue.

If, however, the most important hole within the area covered by a particular drop is a small one, the supply of oxygen may be sufficient to bring about the second stage of the oxidation process in physical contact with the metal, in which event the attack by this drop will be automatically stifled, and no loose rust will appear; the metal will either remain unchanged, or may show the interference colors which are a sign of matter precipitated in optical contact with a metallic surface. Thus it comes about that some drops cause rusting and others do not.

Mears and the author have carried out statistical studies of the proportion of drops which produce attack in different mixtures of oxygen and nitrogen. Experiments on several varieties of iron and steel

showed that the proportion diminishes as the oxygen concentration in the atmosphere is increased, although the velocity attained in those drops which still cause attack rises with the oxygen concentration. These two observations are easily understood. The greater the oxygen concentration the greater is the probability that the second stage will occur in contact with the metal, thus stifling the attack, but the greater the rate of attack that will be attained in those drops where stifling does not occur. The loss of weight produced on a specimen carrying many drops will be obtained by multiplying the number of drops producing corrosion by the mean attack produced by each of these drops, it will first rise with the oxygen concentration and then fall again.

The case just described may be regarded as a two-stage oxidation. Since the final sparingly soluble body is sometimes precipitated at a sensible distance from the metal, the attack does not necessarily stifle itself. But even in the case most favorable to attack, the rate of corrosion is likely to be slow because it is limited by the rate at which ferrous hydroxide can diffuse away from the metal. Now natural diffusion under a concentration gradient is always slow and in this instance it is particularly sluggish because the low solubility of ferrous hydroxide sets a limit to the concentration gradient. However, the movement of charged ions under an electro-motive force is much more rapid usually than natural diffusion. Both natural diffusion and ionic migration depend upon the movement of molecules, which is extremely rapid, but the movement of uncharged molecules is haphazard, so that the number crossing a particular plane will be exactly compensated by the number crossing the plane in the opposite direction, provided the concentration is the same on both sides. If there is a concentration gradient, there will be a small net transfer in the direction of the lower concentration, but even with highly soluble substances, where steep gradients are possible, this transfer is small, and with sparingly soluble bodies, such as ferrous hydroxide, it becomes extremely slow. If an ionized salt is present and an emf. is applied, the movement of the ions ceases to be haphazard, but tends to occur in the direction imposed by the

emf., so that rapid net transfers across a plane at right angles to the direction of the emf. becomes possible. Hence electrochemical corrosion may often be much more rapid than direct oxidation and, since the immediate products of electrochemical corrosion are often freely soluble bodies, electrochemical attack can often occur where direct oxidation would stifle itself.

Imagine a piece of iron immersed in salt water, and suppose that an electric current is flowing from one part to another. Sodium hydroxide will be produced at the cathodic portion, ferrous chloride through the corrosion of iron at the anodic portion, and where they meet they will yield ferrous hydroxide, which will combine with further oxygen to yield rust. This rust, being formed at a sensible distance from the seat of corrosion will not stifle attack. A supply of oxygen to the cathodic portion will increase the supply of current, since oxygen is a cathodic depolarizer; at low emfs the supply of oxygen may even be necessary if the current, and therefore the corrosion, is to continue. Thus it may come to pass

A COMMON way of protecting steel is to give it a hot dip coating of zinc, as this man is doing here. The time of immunity from rusting will depend on the thickness of the coating. If the surface film should be broken and the steel basis exposed, the steel is given cathodic protection and the anodic attack on the zinc will probably somewhat increase its rate of corrosion.



that iron is corroded at one place, oxygen is taken up at a second place, and rust is produced at a third place. Ultimately, therefore, the electrochemical corrosion can be regarded as the union of iron, oxygen and water to yield rust, but it is an indirect union that is unlikely to stifle the attack.

Instrument Measures Surface Emf.

The emf. that maintains the current may arise from various causes, namely chemical difference between different parts of the metal, physical differences between various parts of the metal, differences in the oxide film covering different parts of the metal, and variations in the liquid, for example, a better supply of oxygen to the upper portion than to the lower portion. This classification is quoted because it seems to be suggested in certain quarters that the author regards the fourth cause as the sole one operating. This has never been the case.

Recently, a small apparatus has been worked out which enables the electrical current flowing over the surface of rusting iron to be demonstrated and measured directly without any "cutting" of the specimen, such as might cause disturbances if the cut edges were not properly protected. If a straight scratch be made on a horizontal piece of iron that has previously been exposed to air, and if a piece of filter paper soaked in N/100 sodium bicarbonate is laid thereon, rust soon appears along the scratch line, which is anodic towards the unscratched part on either side. If now the apparatus is momentarily brought into contact with the filter paper at any desired distance from the scratch, a small fraction of the current flowing through the filter paper is diverted through the microammeter and, since the polarization is almost absent, the reading of that instrument is proportional to the current flowing through the filter paper. If the apparatus has previously been calibrated on filter paper, in a similar state of wetness, through which currents of known strength are forced from an outside source, so as to indicate the relationship between the microammeter readings and the true current strength, it is possible to ascertain the real distribution of current around the scratch line. Today, the essentially electrochemical basis of common corrosion appears to be fairly gen-

erally accepted, which was not the case 15 years ago. Controversy continues on certain matters, notably the causes of certain distributions of corrosion; but these disputed questions, although by no means devoid of importance, are less fundamental than those that disturbed the harmony of metallurgical discussion about the year 1923.

One matter about which some disagreement exists is the intense corrosion set up at small breaks in an oxide scale. Let two pieces of the same steel sheet be taken and one of them be heated to produce a scale. After cooling, a scratch line is ruled piercing the scale, and the specimen is placed in a sloping position in a salt solution, with the side carrying the scratch downwards. Corrosion occurs and, being localized on the scratch line, it is very intense and penetrates rapidly into the metal. The unheated piece, placed in the same position in the same liquid, suffers much corrosion, but this will usually be more spread out and less intense. In comparative experiments at Cambridge, the scale-covered specimen has suffered perforation after a few months, whereas the scale-free specimen shows no sign of perforation. This difference has been produced not only with a sodium chloride solution but with water drawn from a well-known port. The explanation seems to be that the scale-covered area is cathodic towards the exposed iron as anode. The strength of the current flowing depends largely upon the amount of oxygen reaching the effective cathodic area, that is, the parts of the scale around the scratch. If the scale is nearly complete, the current will usually be considerable, and the whole of the attack produced by it will fall on the small anodic area at the scratch line, and thus the intensity will be considerable.

This explanation has been queried on the grounds that the scale consists of a bad conducting substance and is very thin. Apparently he pictures the current flowing edgewise along the scale, but this is not necessary. The current will cross the scale at right angles, and the thinner the scale the smaller will be the resistance of the circuit. It is easy to produce this effect even with a scale of hematite, which is a worse conductor than magnetite. Actually it should be mentioned that the re-

sistance of an electrolytic circuit has rather less effect on the strength of the current than is sometimes imagined. The current cannot be obtained by dividing a fixed emf. by a fixed resistance since in a polarizing system both the emf. and the resistance depend upon the current flowing. Whatever the explanation, the facts are not in doubt and are of practical importance. If breaks are present in the scale covering a piece of metal which is then painted and exposed to the weather, then the intense attacks at the breaks in the scale will lead to a large amount of voluminous rust below the paint, causing it to rise up as a blister and finally to burst off. This failure may occur below paint coats which, when applied to scale-free metal, would give admirable protection.

The objections to including mill scale below paint are becoming known to practical men, and both mechanical and chemical methods of descaling are being widely used today. Sandblasting has been condemned on the grounds of danger of silicosis, but shot-blasting appears to be free from this objection. Pickling is cheaper than is sometimes imagined, and the alleged danger of rusting beneath the coat appears to have been overstressed. In any event, it can generally be avoided if the use of phosphoric acid as the final pickling bath is permissible.

Weathering is the slowest and most irregular descaler. It would appear at first sight to be the cheapest and, in an atmosphere rich in acid fumes freely provided by manufacturers, it might be described as "pickling without payment." Whether, however, it could be regarded as cheap after proper allowance for the rent of the weathering ground, the interest charge on the idle material and an insurance policy against the risk that the scale may still refuse to come off at the end of it all, is less certain. In any event, few attempts have been made to take systematic advantage of the natural descaling agent.

In certain circumstances, the composition of the metal itself may greatly influence its behavior, although there are other circumstances where the corrosion velocity is determined by other factors. The possible effect of sulphur may be cited. The highly accurate
(CONTINUED ON PAGE 116)

Keep Down the Cost of Snagging and Billet Grinding

By RALPH M. JOHNSON
Sales Engineer, Norton Co.

HERE is related some practical experience in billet grinding and snagging as gathered by the engineers of the Norton Co., of Worcester.

- 1—Selecting the right grinding wheel for the job,
- 2—Selecting the right machine for the job,
- 3—Doing the operation in the right way.

By giving consideration to these factors it is often possible to effect great improvements in costs and production. For example, in one steel foundry, four men snagging castings on two floor-stand machines could not keep pace with production. Night work was often necessary. They were using vitrified wheels at ordinary speeds.

By substituting high speed machines, using resinoid bonded wheels, two men are now able to snag a considerably higher tonnage than could the four with the less suitable equipment.

While the final selection can sometimes best be made only by actual tests on the job, it is possible to give in a broad way the basic rules for selecting the most suitable wheel, machine and procedure for various jobs and conditions.

There is a choice of two distinctly different types of abrasives,

aluminum oxide and silicon carbide, with several different varieties of the former; a wide variety of grain sizes; several wheel structures—that is, spacing of the grains; three types of bond, vitrified, resinoid and rubber; and many grades—that is, hardness—of bond.

Aluminum oxide abrasives are most suitable for grinding materials of high tensile strength. These include billets and forgings of carbon, alloy or high-speed steels; and castings of carbon steel, alloy steels, annealed malleable iron and tough bronzes.

Silicon carbide abrasives are indicated for such low tensile strength materials as castings of gray iron, unannealed malleable iron, chilled iron, brass, soft bronze, aluminum and its alloys.

The larger the size of grain, the more rapid the removal of stock, which, of course, is desirable in snagging and billet grinding. How large the grain can be is determined by the depth to which the grains can penetrate the material. Thus a coarse grain of 12 or 14 grit will give the most rapid stock



GREAT differences in the cost per unit of snagging castings and forgings and of grind-

ing out defects in billets, blooms, slabs and sheet bars are often found between shops producing the same type of product. Even within a particular shop individual workmen differ widely in their production. Studies in one steel plant showed that while the average amount of material removed in billet grinding was 9 pounds per hour, the best operator removed 16.5 pounds per hour and the poorest only 6.

Three factors have the greatest effect on the cost of snagging and billet grinding:

removal in materials which can be readily penetrated and when heavy pressures on the wheel can be secured, as on swing-frame machines and on floor-stands where pressure is applied by levers or weights.

With light floor-stands and portable grinders or when hard, dense materials are being ground, only shallow penetration can be secured. For such work, grains of

from 16 to 24 grit are best. If a more than ordinarily fine finish is desired still finer grains must be used.

The structure of the wheel—that is, the spacing between the grains—has much to do with the speed with which material can be removed, with economical wheel wear. Wide spacing of the grains is advisable for most snagging be-

cause it permits deeper penetration of the grains, but more important is the furnishing of ample space between the grains to provide clearance for the relatively large chips produced by the coarse grains.

The grade—that is, the strength with which the bond holds the abrasive—should be sufficiently hard to prevent the grains from being torn out before the grains

WHEELS FOR SNAGGING AND BILLET GRINDING

Material	Type of Machine	Abrasive	Grain Size	Grade Strength of Bond	Structure Spacing of Grains	Bond	Treatment
Billets, High Carbon and High Speed Steels	High Speed Swing Frames	Aluminum Oxide	12	Hard (R)	Medium (4)	Resinoid T-2	....
	Slow " " " "	Special Aluminum Oxide	14	" (R)	" (6)	Vitrified	.0115
	" " " " "	Regular " " "	14	" (R)	" (6)	Vitrified B	.0115
Billets Stainless Steels	High Speed Swing Frames	Regular " " "	12	" (S)	" (4)	Resinoid T-2H	....
	" " " " "	" " " " "	14	Very Hard (V)	Close (2)	Rubber R	....
	High Speed Portable	" " " " "	20	" (V)	Close (2)	Rubber R	....
	Slow " " " "	" " " " "	16	Hard (R)	Medium (4)	Resinoid T-2	....
Steel Castings	High Speed Swing Frames	" " " " "	20	" (R)	" (5)	Vitrified B	....
	Slow " " " "	" " " " "	12	" (R)	" (4)	Resinoid T-2H	....
	High Speed Floor Stands	Special " " "	14	" (R)	" (6)	Vitrified B	.0115
	Slow " " " "	Regular " " "	16	" (Q)	" (4)	Resinoid T-2L	....
	High Speed Portable	Special " " "	16	" (Q)	" (6)	Vitrified B	.0115
	" " " " "	Regular " " "	16	" (R)	" (4)	Resinoid T-2	....
	Slow " " " "	" " " " "	20	Very Hard (V)	Close (2)	Rubber R	....
Malleable Castings (annealed)	High Speed Floor Stands	" " " " "	20	Hard (Q)	Medium (4)	Vitrified B	.0115
	Slow " " " "	" " " " "	16	" (Q)	" (4)	Resinoid T-2L	....
	High Speed Swing Frames	Special " " "	16	Very Hard (V)	Close (2)	Rubber R	....
	Slow " " " "	Regular " " "	14	Hard (R)	Wide (8)	Vitrified B	6
	High Speed Portables	Special " " "	14	" (R)	Medium (4)	Resinoid T-2	....
	Slow " " " "	Regular " " "	14	" (R)	" (6)	Vitrified B	6
	High Speed Portables	Regular " " "	16	" (R)	" (4)	Resinoid T-2	....
Malleable Castings (unannealed)	Slow " " " "	" " " " "	20	" (Q)	" (4)	Vitrified B	....
	High Speed Floor Stands	" " " " "	16	" (Q)	" (4)	Resinoid T-2	....
Manganese Steel Castings	Slow " " " "	Silicon Carbide	16	Very Hard (T)	" (5)	Vitrified	.0115
	High Speed Swing Frames	Regular Aluminum Oxide	12	Hard (R)	" (4)	Resinoid T-2L	....
	Slow " " " "	" " " " "	20	" (Q)	" (5)	Vitrified B	.0115
	High Speed Floor Stands	" " " " "	14	" (Q)	" (4)	Resinoid T-2L	....
	Slow " " " "	" " " " "	20	" (P)	" (5)	Vitrified B	.0115
	High Speed Portables	" " " " "	20	" (R)	" (4)	Resinoid T-2	....
Gray Iron Castings	Slow " " " "	" " " " "	24	" (Q)	" (6)	Vitrified B	....
	High Speed Swing Frames	Silicon Carbide	16	" (S)	Close (2)	Resinoid T-2H	....
	Slow " " " "	" " " " "	16	" (S)	Medium (5)	Vitrified	.0115
	High Speed Floor Stands	" " " " "	16	" (R)	" (4)	Resinoid T-2H	....
	Slow " " " "	" " " " "	20	" (R)	" (5)	Vitrified	.0115
	High Speed Portables	" " " " "	20	" (R)	" (4)	Resinoid T-2	....
Brass Castings	Slow " " " "	" " " " "	24	" (R)	" (5)	Vitrified	....
	High Speed Floor Stands	" " " " "	20	" (Q)	" (4)	Resinoid T-2L	12
Aluminum Castings	Slow " " " "	" " " " "	24	" (Q)	" (6)	Vitrified	12
	High " " " "	Regular Aluminum Oxide	30	Medium (O)	" (4)	Resinoid T-2L	12
Welds	Slow " " " "	Silicon Carbide	24	" (O)	" (6)	Vitrified	12
	High Speed Portable	Regular Aluminum Oxide	20	Hard (R)	" (4)	Resinoid T-2H	....
Forgings	Slow " " " "	" " " " "	20	Very Hard (V)	Close (2)	Rubber R	....
	High Speed Stands	" " " " "	20	" (Q)	Wide (8)	Vitrified B	....
Couplers and Draw Bars	Slow " " " "	" " " " "	16	" (R)	Medium (4)	Resinoid T-2L	6
	High Speed Swing Frames	" " " " "	16	" (R)	" (6)	Vitrified B	....
Couplers and Draw Bars	Slow " " " "	" " " " "	12	" (R)	" (4)	Resinoid T-2H	....
	High Speed Swing Frames	" " " " "	10	Very Hard (U)	.....	Vitrified	.0115

Note:—The letters designating degree of grade are those used by Norton Co. They are as follows: Very Soft—E, F, G; Soft—H, I, J, K; Medium—L, M, N, O; Hard—P, Q, R, S; Very Hard—T, U, W, Z. The numbers designating structure (spacing of grains) are those used by Norton Co. They are as follows: Close Spacing—0, 1, 2, 3; Medium Spacing—4, 5, 6; Wide Spacing—7, 8, 9, 10, 11, 12.

have done their full share of cutting. The worker prefers a soft, rapid-cutting wheel. Such wheels wear rapidly and so unduly raise the wheel cost. It is possible to select a wheel which will give the maximum of wheel life while at the same time giving a proper rate of production.

Generally, use a hard grade of wheel for soft materials and a softer grade for hard materials. Thus, the grain will be torn from the wheel before it has become too dull to be effective. The amount of pressure applied to the wheel and the presence or absence of vibration in the machine also influence the grade. The greater the pressure, the harder should be the grade. Vibration in a machine tends to make wheels wear rapidly and therefore calls for a harder grade.

Vitrified bonded wheels ordinarily operate at about 6000 surface feet per minute. In order to get the high production desired on snagging operations, it is sometimes desirable to use resinoid bonded wheels which can operate as high as 9500 surface feet per minute. They give a greatly increased rate of production and consequently lower cost than the slower speed, vitrified bonded wheels. This applies particularly to those grinding operations where the time the wheel is in actual contact with the work is a high percentage of the total elapsed grinding time. Resinoid bonded wheels also give a smoother finish, which is often desirable.

Rubber bonded grinding wheels are also used at high speed when a particularly smooth finish is desired, such as on the surfaces of stainless steel billets.

Selecting the Right Machine

For snagging large and medium sized castings and for billet grinding, swing-frame machines are used. The twenty-four inch diameter wheel is good for heavy work and for the removal of large amounts of material. Wheels as small as sixteen inch are used on swing-frame machines for smaller castings and billets. Remember that the larger machines usually are most economical and give greater production. The advantage of the lighter machines using smaller wheels is that they handle more easily. They are also useful in grinding in limited areas, as for

example, in removing seams or cracks from billets.

Floor-stand machines may be used for all kinds of castings and forgings. Thirty inch diameter wheels are probably the most favored, although at high speeds, wheels as small as 20 in. are used.

Portable machines driven by air, electricity or flexible shafts are widely used to supplement swing-frame and floor-stand machines for snagging on large and intricate castings and forgings and for smoothing welds.

When straight wheels are used on portable grinders those of six or eight inch diameter give good performance. Cone or cup shaped wheels are often used for cleaning irregularly shaped castings and small radii and in getting at the hard-to-reach spots, such as inside surfaces.

Wheels for use on portable grinding machines are made of vitrified, resinoid or rubber bond.

Machines for snagging and billet grinding should be kept in good condition. If they are allowed to get out of balance, or to develop loose bearings, vibration will result which in turn causes intermittent contact between the wheel and the work. This slows down the rate of metal removal and because of the impact between wheel and work crushes the face of the wheel thus increasing the rate of wear. A properly maintained machine usually produces more work than one that vibrates.

Failure to operate the wheel up to its proper speed obviously decreases production, yet under-speed operation is a commonly overlooked fault. It may be due to belt slippage, inadequate motors, or, where such adjustment is possible, failure to change pulley speeds as the wheel wears down.

Doing the Operation the Right Way

Even though a shop be equipped with a variety of machines, it may, by failing to utilize them to best advantage, operate at a high cost. The reason is that too often the work is not assigned to the proper machine. A wheel or machine will not give the best performance on work different from that for which it is specifically designed.

Sometimes in steel mills, billets

are delivered to the grinders before they have had time to cool. While this is supposed to reduce costs by saving time, it actually, as a rule, runs up the total cost, because grinding hot steel increases the likelihood of wheel breakage and also is destructive to resinoid and rubber bonds.

Obviously, it is to the interest of the operator on piece work to remove material as rapidly as possible regardless of wheel wear. Some grinders resort to devious devices to accomplish this. Therefore it is well to exercise close supervision to make sure that wheel wear is not allowed to become excessive. Some of the wheel wasting methods in snagging and billet grinding operations are the following:

Excessive pressure is frequently applied by the workman in order to get the face of the wheel to break down more rapidly and so, by constantly presenting new cutting faces to the work before the old grains have done their share, to increase production.

A wheel is made so that it will break down at the correct reasonable pressure and thus be self-sharpening. If it is operated at an excessively high pressure, it will not show the same economy.

Using only the corner of a wheel on either swing-frame or floor-stand machines results in excessive wear. This practice also destroys the shape of the face and requires too frequent wheel dressing with consequent waste of the available abrasive.

Wheels should be brought against the work carefully. To make the contact suddenly will result in considerable impact, which tends to get the wheel out-of-round, and can even cause breakage which is not only expensive but dangerous.

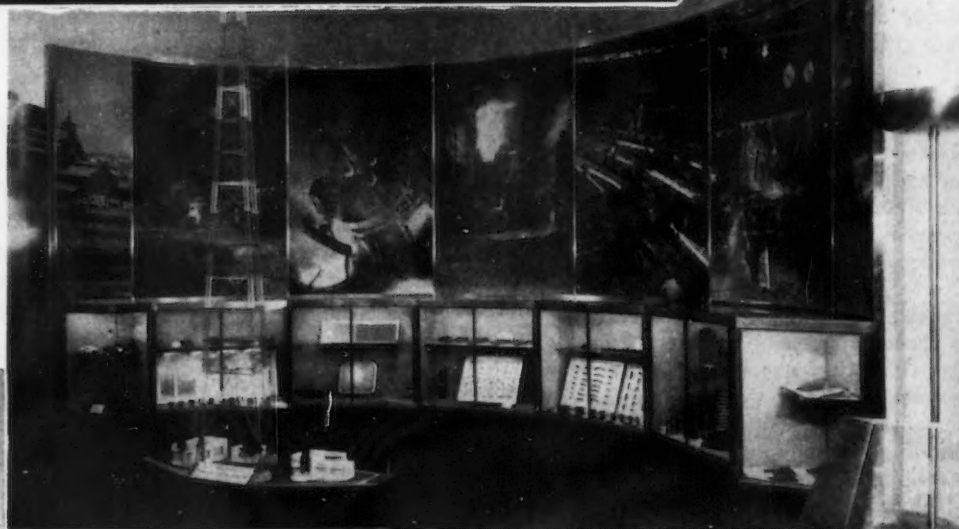
The wheels recommended for various kinds of snagging and billet grinding operations are listed in the accompanying table. As has been said, these recommendations hold for most conditions. However, in many cases where special conditions exist as to material, type of work, machines and so on, some variations may be desirable. In such cases actual tests in the plant will show just what wheel will most economically do the job.

Republic Steel Corp. Utilizes Company Products to Embellish Its Office Lobbies



THE reception lobby on the 14th floor of the Republic Building, Cleveland, which serves the general offices, contains stainless steel show cases in which products fabricated by various customers from Republic's products are displayed.

ALSO in the 14th floor reception lobby are large photomurals depicting the various basic steps in the manufacture of steel.



THE reception desk is made of Enduro stainless steel. The lobby is air conditioned and lighting is mostly indirect in order to eliminate shadows and place the most effective light on products displayed. All display cases were custom built and specially designed. Wilbur Henry Adams, Cleveland industrial designer, was consultant in the work.

Shock-Absorbing Roller Conveyor Designed to Reduce Maintenance

TO minimize the abuse of conveyors employed in transporting heavy loads, and thereby reduce maintenance costs, the Mathews Conveyor Co., Ellwood City, Pa., has developed the shock absorbing, resiliently-mounted roller conveyor here illustrated.

With the conveyor resiliently mounted, each roller is said to carry its proportionate share of the load, regardless of unevenness of skids, etc. This reduces bearing friction to normal and permits the use of a lower coefficient of friction in calculating the effort required to move the loads.

The need for a conveyor of this type is said to have arisen from the increasing use during the past decade of roller conveyors for the handling of heavy loads. In foundries they are being employed for transporting not only heavy molds and castings, but for groups of castings laid upon racks—in one case the combined weight of the

bearing failures is case-illustrated by the company as follows. "A conveyor employed in a steel foundry was designed to handle 40-in. long molds weighing 8220 lb. As the molds are carried on metal skids, the rollers were spaced on 4-in. centers in order that the molds would be supported at all times, theoretically by 10 rollers. With each roller carrying its proportionate share of the weight, the burden on each figured 811 lb. But because the bottom of the molds were uneven and the skids were distorted, it was found that the entire load was actually carried by only two rollers, with the result that each roller supported 4110 lb. instead of 811 lb. as calculated. Under these conditions bearing failures were inevitable."

Other tests in the same plant are said to have revealed similar uneven load distribution in nearly every case.

Abuses in loading are illustrated



racks and castings being as much as 12,000 lb. In steel plants, sheets in piles weighing up to 40,000 lb. are being conveyed from one operation to another on roller conveyors. Coils of strip steel that in some cases weigh as much as 25,000 lb. are being handled in the same manner.

Extension of use of roller conveyors in this direction has brought about marked improvements in bearings and rollers and in weight and rigidity of the supporting structures. The present development—the resiliently-mounted roller conveyor—is designed further to overcome difficulties arising from uneven loading and the abuses resulting from the loading and unloading of heavy material on and off the conveyor.

Uneven loading, resulting in high bearing maintenance or in

by the company in the handling of large coils in a continuous strip mill. Frequently these coils are loaded on to the conveyor by means of a crane equipped with a magnet. With a careless operator, both the coil and the magnet—a total weight of some 35,000 lb.—may be dropped on the conveyor with considerable impact, resulting in damaging abuse to the rollers. Somewhat the same conditions are said to be found at points where the coils are taken from the conveyors by crane. It is claimed that in actual tests under these conditions, the springs of the resiliently-mounted conveyor effectively absorbed the shock, and prevented injury to the bearings of the rollers.

Applications of the new conveyor other than those mentioned above include the transporting of ladles of molten metal, buckets of foundry sand, heavy machinery, and of heavy shipping cases and boxes.

Heat Indicating Paints

ELFKALIN CO., 804 East 141 St., New York, has developed a series of paints which have the property of changing color when subjected to temperature. Some of these paints are "retroactive," and resume the original color when the temperature is reduced; others of them stay permanently changed.

The function of these paints is to give warning to operators of machinery, and processes of the presence of temperature conditions which may be deleterious.

Permanent change Elfkalins require recoating of the part after each change. The retroactive types are good for from 25 to 50 changes before renewing.

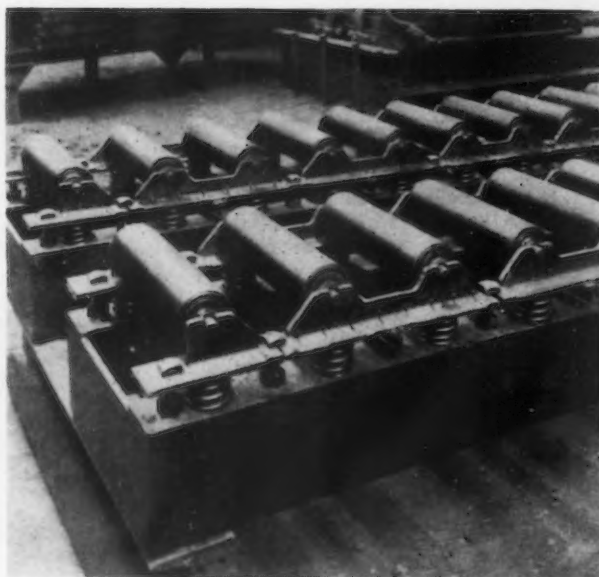
ABOVE

INDIVIDUAL "two-roller" resiliently-mounted conveyor sections are placed on concrete, and spaced far apart, for handling long racks of castings.

o o o

AT RIGHT

8000-lb. buckets containing conditioned foundry sand are loaded and unloaded on this conveyor without damage to either the conveyor rollers or bearings.



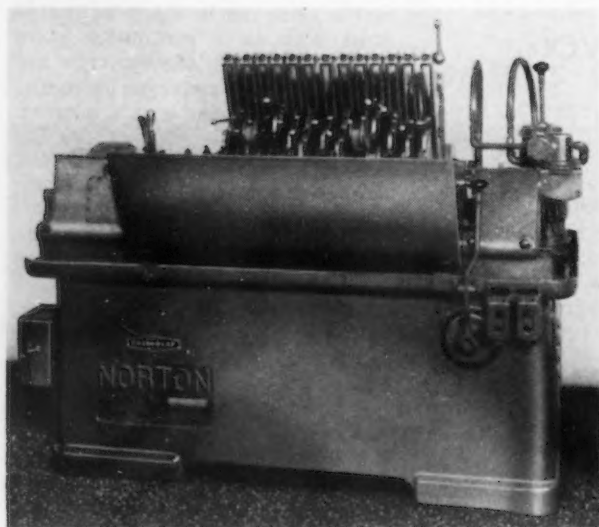


FIG. 1—Front view of Crank-O-Lap machine with splash guard in place.

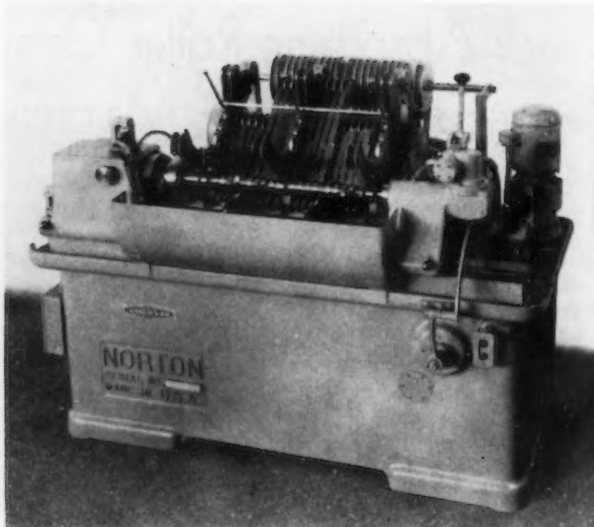


FIG. 2—Crankshaft lapper with abrasive paper applied to 19 cam and bearing surfaces.

New Crank and Cam Lapping Machines Introduced by Norton Co.

FOR lapping all bearing surfaces on crankshafts and camshafts, the Norton Co., Worcester, Mass., has brought out two new lapping machines, designated as the Crank-O-Lap and Cam-O-Lap, respectively.

The Crank-O-Lap, type 30, is pictured in Fig. 1. A motor in the base connects with the headstock by V-belt and with a hydraulic pump by a flexible coupling. The base, which is of box shape and heavily ribbed, supports a work table and a lapping arm frame. The table, in turn, supports the headstock, footstock and work-rests. It is provided with hardened steel V-shaped ways which bear on steel balls. As the table reciprocates when the work is being lapped, the steel balls reduce friction to a minimum.

The lapping arm frame is pivoted and carries a bar to which guides for the arms are fastened and also a shaft for spools of abrasive paper strip. The lapping arms are jointed so that they will follow the pins of the crankshaft as it revolves. Take-up spools for winding used abrasive strip are carried at the ends of the arms,

Actual lapping of each pin and bearing is done by shoes which hold the abrasive strip firmly in place against the surfaces being lapped. These shoes are closed by means of levers. Lapping lubricant is automatically pumped on the work.

The type 30 Cam-O-Lap shown

in Fig. 2, is built on the same base as the crankshaft lapper, but is different as to application of the abrasive strips and as to the action of the lapping arms.

Unit pressure against the cam surfaces must remain constant, and this is accomplished by providing a master cam for each cam lapping arm, thus controlling the movements of the arms. The abrasive strips are held against the cams by

shoes, the movement of which is controlled by the master cams.

To produce the proper grade of finish, the abrasive strips and supports are reciprocated rapidly in the direction of the camshaft axis while the cam shaft is rotating and reciprocated with a slower motion. These motions result in the crossing and recrossing of the paths followed by the laps and produces the degree of finish required.

A separate set of lapping arms identical with those used for crankshaft lapping are employed for lapping the camshaft bearings. Cam contours and camshaft bearings are lapped simultaneously.



New Sheffield Comparator Gage

THE comparator-type gage here illustrated is a new product of the Sheffield Gage Corp., Dayton, Ohio. It embodies many of the features of the company's visual-type gages but is lower in price. The gaging head utilizes the patented Sheffield fine-adjusting sleeve for rapid movement of the dial hand to the final setting. It is raised and lowered by a handwheel at the right and is locked quickly and securely by means of a clamping wheel at the left. The entire head may be swiveled on the column to permit gaging from surfaces other than the self-contained anvil. Indicators are of standard make. They can be obtained in both the one-thousandth and three-thousandth range; either may be read to tenths by an experienced operator. Special anvils can be supplied.

Develops Universal Broaching Machines

• • •

A UNIVERSAL broaching machine representing a combination of utmost flexibility and adaptability together with high production speed and automatic operation, has been developed by the Colonial Broach Co., Detroit. Designed for pull-type broaching and hydraulically operated, it is as readily adapted to surface broaching as to the broaching of holes, round or splined, helical or straight, keyways and the like. Available in two basic stroke designations—48 and 60 in.—the machine comes in four capacities: 6, 10, 15 and 20 tons.

Stop collars are provided on the machines so that any requirement

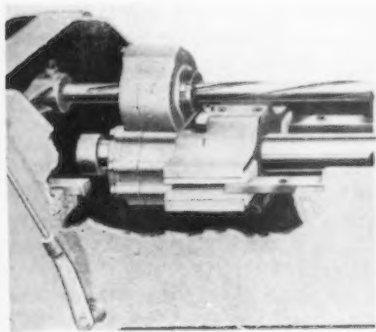


FIG. 2—Special spiral drive attachment developed for broaching internal spiral splines.

as to stroke length can be met, in accordance with the work to be done and the broach being used—assuring maximum production capacity. Standard cutting speed is 30 ft. per min., but a conveniently placed control permits adjusting of cutting speed to any speed up to this figure that may be desired. Return speeds of either 60 or 100 ft. per min. are optional and are controlled by a differential-area design in the operating cylinder.

For surface broaching, the unusually large faceplate capacity, with its two keyways for ease and accuracy of location of large surface broaching fixtures, is noteworthy. Tools up to 9 in. in width or even slightly larger, may be used

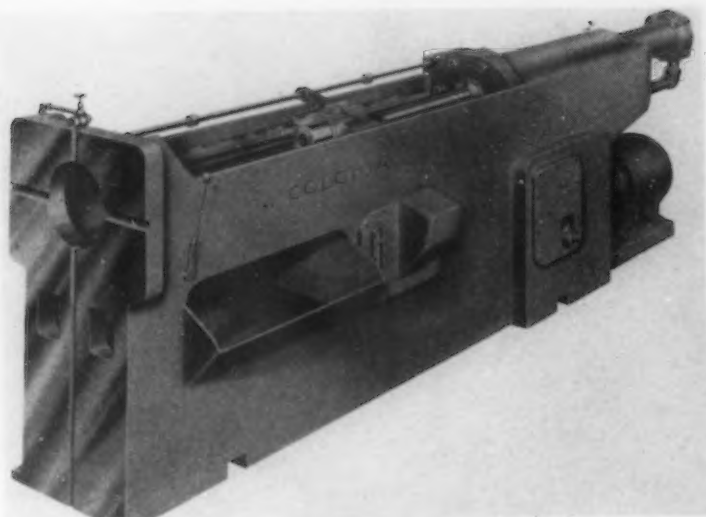


FIG. 1—Universal broaching machine designed for adaptation to almost every type of broaching operation.

with this machine. The need for follow rests for the handling of very large broaches has been recognized, and provided for in the design for ready application when needed.

For broaching of internal helical splines, either straight or involute, a spiral drive attachment has been developed for this machine. It consists of a rigidly mounted spiral master bar which, through gears, causes the broach to rotate as it passes through the work, producing the correct helical lead in the finished part, eliminating side thrust and drag on the sides of the splines and increasing broach life. All machines are furnished with mounting pads for this attachment.

The machine may be operated from either the right or left sides, dual controls being provided.

A complete range of broach pullers is available. Included are the recommended automatic pullers designed for maximum accuracy in maintaining alignment and proper broach locating; also threaded pullers for the broaching of keyways; and key-type pullers where maximum simplicity and low cost are desired. Puller adjustment is simplified by the provision of locating markers on the cross-head and pull-head.

Furnished with every machine as standard equipment is a chip trough designed to accommodate the longest broach. From this trough all drippings and chips drain back into a chip pan provided with perforated trays, and sump. Chips can be removed from either side of the machine.

Following Colonial Broach practice, the new "Universal" has a base of fabricated steel. Crossheads are provided with easily replaceable hard bronze shoes which travel on

hardened and ground ways for maximum life. The hydraulic power mechanism consists of an enclosed, externally located (for accessibility) electric motor direct-

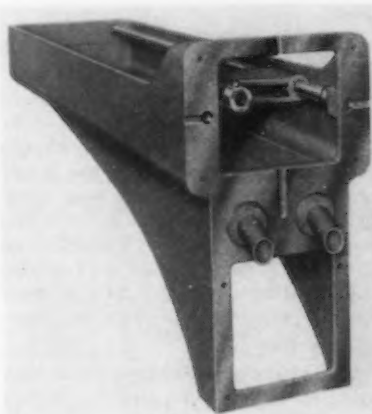
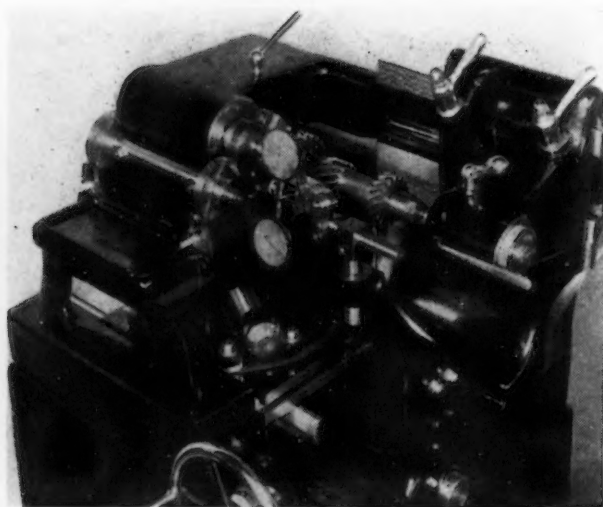
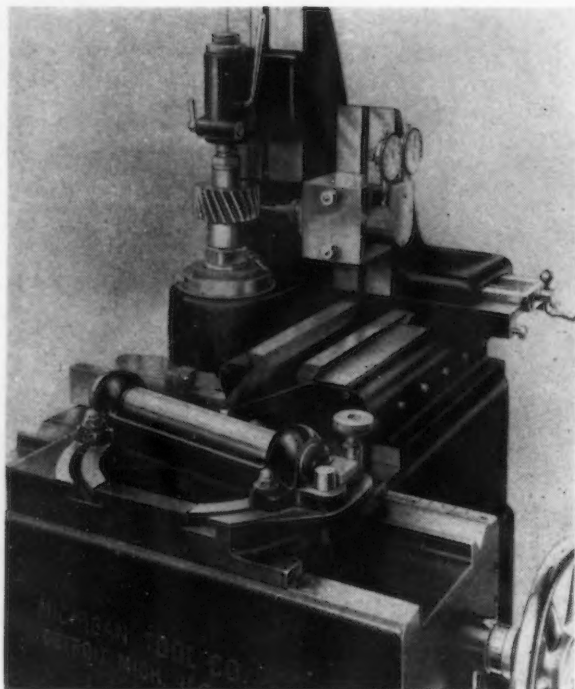


FIG. 3—Chip troughs on the universal broach extend the entire length of the broach, providing maximum broach protection and insuring proper drainage of chips and coolant toward the separator trays and sump.

coupled to a 1000 lb. hydraulic pump. Coolant pumps are of generous capacity. Coolant flow starts and stops with the machine for maximum ease of work handling.

The Joseph Block and N. F. Loepold, ore and stone boats operated by the Inland Steel Co., opened navigation on Lake Michigan April 6 by starting for Port Inland, near Manistique, Mich., for their first loads of limestone for use in the blast furnaces and open hearths of Inland's Indiana Harbor steel plant.



ABOVE

FIG. 2—The spiral lead checker is designed for gears up to 16 in. in diameter.

AT LEFT

FIG. 1—Combined involute and tooth spacing checker brought out by the Michigan Tool Co.

Michigan Tool Completes Line of Gear-checking Equipment

WITH the introduction of three new machines, the complete line of gear-checking equipment offered by the Michigan Tool Co., Detroit, now comprises a combined tooth-form and tooth-spacing checker; a spiral lead checker; a hob-contour and worm-lead testing fixture; and a gear speeder, the latter brought out some months ago.

A feature of every piece of equipment is the use of a sine bar either for setting the machine or for use as a cam to procure a ratio of movement between two moving parts, or to control the movement without the use of a leadscrew.

The combined tooth form and spacing checker, Fig. 1, is designed to permit rapid readings, and is adapted for taking of charts for comparison with other checking devices. The sine bar acts as a compensator for the differences between the lengths of arc on the friction disk, which originates the machine movements on the base circle of the gear being checked.

The friction disk is integral with the work-holding spindle and imparts movement to the sine-bar carriage. The angular setting of the sine bar controls the movement of the indicator head, which is counterweighted to hold it against the sine bar. Each degree of work rotation may be read on a scale alongside the sine-bar carriage.

Use of two indicators and a reversible finger for tooth form makes possible the reading of tooth form on front and back faces in the same set-up. Gears up to 12 in. in diameter by 12 in. in length, can be checked on this machine.

The spiral lead checker, shown in Fig. 2, is for gears up to 16 in. in diameter with leads of 6 in. or more for either right or left hand spirals. The sine bar is set to correspond with the correct spiral lead by means of two measuring buttons. The sine-bar carriage and

the indicator are moved by hand-wheel. A clevis straddling the sine bar moves the upper carriage at right angles to the sine-bar carriage. The work-holding spindle is revolved by the friction of two lapped blocks on rolls. In this way indicator movement and gear rotation are synchronized during checking. When the indicator is in contact with the gear tooth, any variation from the proper lead is shown on the indicator.

It is stated that the Michigan gear-checking equipment is designed for maximum flexibility, so that it is readily adaptable for the analysis of a large number of gears of the same characteristics, as well as a small number of gears of widely varying designs.

To Correct Data on Machine Tool Exports

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION has issued a bulletin to its members asking for cooperation of the industry to improve the accuracy of the classified data contained in the "Shippers' Guide" issued by the Machinery Division of the United States Department of Commerce.

With exports of machine tools aggregating \$24,800,000 in 1936, which was the highest in 10 years, the need for accurate statistics is emphasized. Within the past few months the attention of the association has been called to some obvious errors in the allocation of exports to the various classes. Investigation

has shown that such errors in large part are due to inaccurate description of goods on the "shippers declaration" and particularly in the insertion of wrong class numbers called for in the last column of the declaration.

In making declarations for export shipments, machine tool builders are urged to determine carefully the class numbers that are applicable, make sure that the correct number is given in the case of each export shipment and also be sure to give a sufficiently clear description of the machine to enable the department to make the proper classification.

It is felt that cooperation of machine tool builders in this matter will correct existing errors and make the data more usable.

Scrap Exports Increase Sharply; But are Below Early 1936 Period

WASHINGTON, April 8.—After declining to 72,849 gross tons in January, exports of iron and steel scrap rebounded to more than double this figure in February, when they totaled 151,271 tons and along with the rise in volume, there was also a sharp increase in the unit value, the February average having been \$17.20 a ton, while the January average was \$15.70.

The total value of the February scrap shipments was \$2,601,040 compared with the January total of \$1,148,093. Compared with one year ago, the price showed a sharp increase of \$5.90 a ton, the February, 1936, unit value having been \$11.30.

For the first two months of the

present year, however, exports of scrap totaled 224,120 tons, against 303,964 tons in the corresponding period of 1936, a decline of 26.4 per cent, but from the standpoint of value, the 1936 aggregate was valued at \$3,749,133 against \$3,533,976 in January-February 1937, an increase of 6.1 per cent.

Pig Iron Exports Rise

The February totals, based on preliminary statistics released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce, also reflect a relatively sharp rise in exports of pig iron, thus emphasizing the foreign demand for raw materials for the manufacture of steel. Pig iron exports in February rose to 17,118

tons from 13,329 tons in January, and it is known that these shipments would have been considerably higher had domestic blast furnaces satisfied all foreign demand. The combined total exports of pig iron in January and February of the present year were 30,447 tons compared with only 237 tons shipped in the corresponding period of last year. The high rate of demand, together with the shortage of supplies in foreign producing countries, is clearly indicated when it is noted that pig iron shipments from the United States in only the first two months of 1936 exceeded the aggregate shipments of 25,312 tons for the entire six-year period, 1931-1936.

Exports of iron and steel products, excluding scrap, in February amounted to 139,716 gross tons valued at \$9,835,664 against 128,843 tons valued at \$9,327,749 in January, and 68,800 tons valued at \$5,166,779 in February, 1936.

In reaching this figure, iron and steel exports were at their peak monthly volume since May, 1930, when a total of 153,858 tons of semi-finished and finished iron and steel products was exported.

Tin plate was the principal finished product exported in February, totaling 19,032 tons, compared with 25,232 tons in January. February exports of black steel sheets (CONTINUED ON PAGE 86)

Exports of Iron and Steel from the United States
(In Gross Tons)

	February		Two Months Ended February	
	1937	1936	1937	1936
Pig iron	17,118	51	30,447	237
Ferromanganese and spiegeleisen	16	1	91	8
Other ferroalloys	335	146	428	420
Iron and steel scrap	143,197	142,165	212,081	296,071
Tin plate scrap	3,053	1,313	4,342	3,774
Waste-waste tin plate	5,021	1,524	7,697	4,119
Pig iron, ferroalloys and scrap	168,740	145,200	255,086	304,629
Ingots, blooms, billets, sheet bars	6,808	314	8,598	409
Ingots, alloy steel incl. stainless	63	...	107	...
Skelp	2,777	1,525	4,308	2,337
Wire rods	1,680	1,786	4,959	5,725
Semi-finished steel	11,328	3,625	17,972	8,471
Bars, plain and reinforcing	6,636	4,768	11,912	8,171
Bars, alloy steel	572	...	907	...
Bars, stainless steel	8	...	55	...
Iron bars	79	75	169	193
Plates, plain and fabricated	14,789	5,241	22,207	8,775
Plates, alloy steel	98	...	111	...
Plates, stainless	3	...	5	...
Sheets, galvanized steel	3,734	3,404	9,230	9,699
Sheets, galvanized iron	116	98	1,110	228
Sheets, black, plain steel	13,123	9,306	26,419	18,122
Sheets, black, alloy steel	49	...	63	...
Sheets, black, stainless	46	...	92	...
Sheets, black iron	270	635	974	1,251
Hoops, bands, strips, plain steel	6,644	4,367	14,854	9,321
Hoops, bands, strip steel, alloy	160	...	296	...
Hoops, bands, strip steel, stainless	34	...	98	...
Tin plate and taggers' tin	19,032	12,866	44,264	30,891
Terne plate (including long terne)	427	203	1,068	636
Structural shapes, plain material	6,544	3,880	11,056	7,228
Structural material, fabricated	3,329	685	4,932	1,847
Sheet piling	234	129	1,081	414
Tanks, steel	957	2,276	1,510	4,356
Steel rails	2,828	4,108	8,902	8,438
Rail fastenings, switches, spikes, etc. ..	874	672	1,570	1,564
Boiler tubes	984	345	1,742	804
Casing and oil line pipe	8,658	1,194	13,858	3,678
Pipe, black and galvanized, welded steel	2,321	1,343	6,693	4,633
Pipe, black and galvanized, welded iron	526	109	697	496
Plain wire	3,754	1,922	7,954	6,952
Barbed wire and woven wire products	3,108	2,628	6,757	4,446
Wire rope and other products	1,072	671	1,863	1,445
Nails and tacks	1,849	909	3,235	1,826
Bolts, nuts, rivets and washers, except track	895	448	1,593	909
Other finished steel	254	106	406	319
Rolled and finished steel	104,007	62,388	207,683	156,642
Cast iron pipe and fittings	3,637	688	6,208	1,473
Malleable iron screwed fittings	307	181	590	408
Carwheels and axles	1,064	366	1,692	651
Castings, iron and steel	1,220	1,122	2,155	2,178
Castings, alloy steel, incl. stainless ..	106	...	243	...
Forgings, plain	557	232	895	914
Forgings, alloy steel, incl. stainless ..	21	...	155	...
Castings and forgings	6,912	2,589	11,938	5,624
Total	290,987	213,802	492,679	455,366

United States Imports of Pig Iron
by Countries of Origin

	February		2 Mos. Ended February	
	1937	1936	1937	1936
United Kingdom	150	...	...	1,082
British India	5,863	5,058	11,267	8,689
Germany	50	868	250	2,476
Netherlands	1,332	7,981	5,984	12,492
Canada	653	358	1,217	358
France .....	...	...	...	...
Belgium .....	...	...	...	529
Norway	275	245	275	347
Sweden	200	...	200	...
Russia	2,967	...	4,581	3,720
All others .....	...	...	...	...
Total	11,340	14,660	23,774	29,693

February Imports of Iron and
Manganese Ores

	Iron Ore		Manganese Concentrates, 35 Per Cent or Over	
	1937	1936	1937	1936
Canada	120	151	...	...
Cuba	33,000	24,090	5,670	...
Chile	128,600	86,425	...	...
Spain .....	...	...	...	...
Norway	22,968	13,868	...	...
Sweden .....	...	...	...	...
French Africa .....	...	...	...	...
Russia .....	...	...	3,638	12,454
India .....	...	...	3,402	...
Brazil	11,000	...	...	10,975
Gold Coast .....	...	...	7,394	5,415
Other countries ..	14,315	380	77	774
Total	210,003	124,824	20,181	29,618

THIS WEEK ON THE ASSEMBLY LINE



... Nearly three million cars to come off assembly lines by end of second quarter if automotive labor peace continues.

o o o

... Michigan, battlefield for CIO, sees Chrysler victory complete and sporadic sit-downs at sudden end.

o o o

... Strike threat at bearing plant and on Great Lakes ships still hold fear for industry.

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... Two of "big three" may have truck diesels in field within year.

DETROIT, April 12.—With industry at peace with labor for the first time in many months, automobile builders are geared up to produce at maximum capacity until the new model slack-off. Barring further outbreaks, production can reach 1,585,000 cars and trucks in the second quarter, making the total estimated production for the half year close to 2,900,000, according to Ward's Automotive Reports. Only the 1929 figure is greater than this for a half year period, so ready acceptance of 1938 models might well send automobile production and sales to an all-time peak. Sales departments believe that cars will be sold if deliveries can be made.

Hudson Motor Car Co.'s sales support that belief, since not even the long sit-down at Hudson prevented the retail sale of more than 12,000 cars in the last month, the best March in seven years.

More new Pontiacs were delivered in March than in any other month of the company's history, delivery of 25,609 units going over the April, 1929, mark of 23,750. Chevrolet sales so closely parallel output that many dealers have not been able to get extra cars to use for demonstrations. General Motors as a whole exceeded March, 1936, sales of 181,782 by selling 196,095 units in the United States, while worldwide sales by General Motors exceeded 250,000.

The industry's production in the past week rose to 100,470 passenger cars and trucks, compared with 97,710 in the previous week. This Week, with Chrysler intending to turn out 6000 a day, should show about 120,000, if production accelerates rapidly.

High production can be maintained as long as sales justify, because this year there will not be many long shut-downs for model changes. Only grille and front-end changes are contemplated. Plymouth, which had a new engine in mind, has decided not to release it. Chevrolet, despite published rumors, will stick to its present body design, including the crease through the cowl side and the front door. Hood and grille changes are contemplated, however, in line with general practice of changing these each year. The Cadillac line presents another story, with a revamping in the wind that will change the V-16 engine as well as appearance items.

The return of more than 100,000 men to work at Chrysler, Hudson, Reo, Briggs and parts manufacturing plants will improve Detroit's industrial employment index considerably. It was at 87.7 on March 15, sinking to 87.3 on April 1, depths not seen in a long time locally. Previous to the strike-born slump the figure was up to 128 on March 1.

Labor Skies Clearer

Chrysler's complete victory over the UAW, followed by the other strike settlements, puts the auto-



mobile industry under clear skies for the first time in four months. Michigan, selected as a battlefield by the CIO, now feels fairly secure against further attack. To all appearances the sporadic sit-down strikes have ended as quickly as they began. If the words of union leaders can be backed by hard-handed control over union members, there is now a chance for industrial peace with honest negotiations over honest differences of opinion.

Surprisingly enough, there has been no sound of complaint from the side of the UAW, despite the fact that it received the severe drubbing that is apparent in the Chrysler pact. Actually the union gained nothing not already granted to it both at Chrysler and Hudson—the agreement specifies recognition of the UAW to the extent of its membership, no more. This in itself should be apparent to all, but most of all to the thousands who lost a month's work and a month's pay battling for the theory that sole collective bargaining privileges should be granted the UAW. From unions outside the CIO union, nevertheless, there has been a great hue and cry to the effect that the Chrysler agreement gives, for nothing, an unconditional pledge surrendering the right to strike for a year.

Cleveland Scene of Trouble

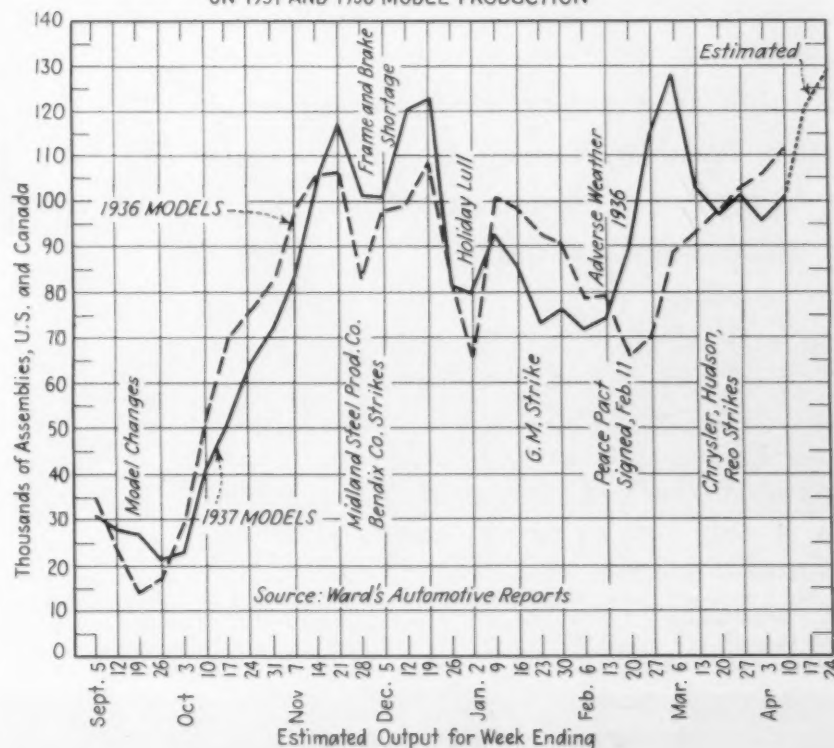
One big threat still faces the industry. That is a disturbance at the Cleveland Graphite Bronze Co., Cleveland, where the Mechanics' Educational Society of America holds forth in consider-

able strength. At this plant, MESA men started to strike Thursday afternoon, but Matthew Smith, executive secretary of MESA, talked the men into continuing at work. On Friday, however, Smith flew back to Cleveland to try again to stave off a strike. The company, which has been talking things over with unions, including a company type organization, is an extremely important

factor in the automobile business. It supplies engine and transmission bearings to the "big three" and virtually all other automobile concerns.

Suppliers of Chrysler and Hudson materials and parts have put on pressure to keep a satisfactory stream flowing into the plants. Chrysler was well protected, having stored its incoming material in warehouses, yards and side-

EFFECTS OF STRIKES AND WEATHER
ON 1937 AND 1936 MODEL PRODUCTION



BULLARD

Type "D" MULT · AU · MATICS

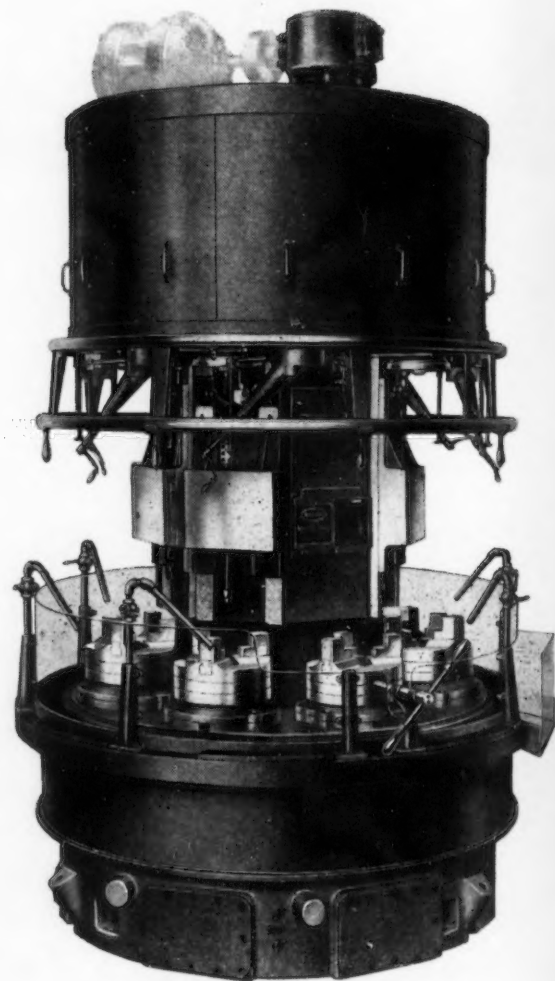
● Manufacturing Economy is the first step in Profit Increase.

● This Economy in machine tools is only obtained by those manufacturing units which provide in their design and construction features of Versatility, Reliability, Productivity, and Efficiency.

● Bullard Mult-Au-Matics have for years been accepted manufacturing units because of these inherent features.

● Today, operating facts and savings are proving that Mult-Au-Matics are Sound, Profitable Investments on jobs requiring Boring, Turning, Facing, Drilling, Reaming, Threading, and a host of other standard and special operations.

● In one instance, on Rear Axle Driving Gears of hot rolled steel, the Mult-Au-Matic time per piece is 1 minute and 39 seconds. Savings in this instance warranted the use of the Mult-Au-Matic. This is only one of many cases. If others can profit, so can you.



Type "D" Machine Sizes

8 inch - 6 Spindles
8 inch - 8 Spindles
12 inch - 6 Spindles
12 inch - 8 Spindles
16 inch - 6 Spindles
16 inch - 8 Spindles

The Bullard Company
Bridgeport · Conn.

tracked trains all around Detroit. Also, Chrysler followed the Fisher Body Co. plan of having steel mills bring along strip to the final cold rolling stage. Thus a great deal of processing time will be saved in getting back into automobile production. Mill schedules in many cases were changed from week to week so Chrysler now will be in line to have its steel rolled.

Tool and die shop men heard this week to their further dismay that more important work has been sent out of town. The latest is about \$300,000 of work for Fisher Body, which was let on a time and material basis. Labor difficulty in this field may be avoided by a series of parleys now going on between the Tool & Die Manufacturers' Association and two unions, the UAW and the MESA. Apparently settlements are not far off, since the UAW demand for \$1.60 per hr. for die leaders is not being seriously pressed.

Ore carriers on the Great Lakes are watching with interest the spread of union activities among crews. One contract, between the Nicholson Transit Co., of Detroit, and the Firemen, Oilers, Water Tenders and Coal Passers Union, already has been signed, but other vessel operators have not got to that stage. Union representatives now are concentrating attention on car ferry operators. Labor trouble on the Great Lakes would, of course, have a serious effect on the steel industry, since it might come at a time when heavy ore movements would be under way. Automobile shipments by water, incidentally, started last Thursday between Detroit and Buffalo.

Renewed activity by Hupp Motor Car Corp. and Reo Motor Car Co. is anticipated now that their proposals have reached the Securities and Exchange Commission. With the showings made in the last year by the independents such as Willys, Graham, Studebaker and Hudson-Terraplane, there is an added attraction in the business that may well draw Reo into the passenger car field again. The inference is that something radical in automotive design will be forthcoming.

One design feature that will be seen in 1938 cars for the first time is the Latex "foam" rubber seat cushion and back, replacing the conventional upholstered springs. At least two passenger car manufacturers are seriously considering adopting the new seats. Rail cars and sleeper buses are already being equipped with these seats. Lighter weight is one of

the most prominent features claimed for the cushions.

Cold Strip Mill at Toledo

Industrial expansion in Toledo will include its first steel mill, a small cold-rolled strip plant to be erected by the Fort Pitt Steel Co., which previously has operated a steel warehouse. The De-Vilbiss Co., manufacturer of atomizers and spray painting equipment, will build a completely new rubber products plant to replace one built in 1928. The new plant will cost \$175,000 and the former unit will be used to house part of the present facilities. Despite stop orders from Chrysler to many of Toledo's small parts manufacturers, the city reports a dollar volume of business 72 per cent above that of March, 1936. Resumption of Chrysler production will call back about 6000 Toledo workers.

Electric power consumption by Ford Motor Co. in the Detroit area set an all-time record in 1936, when 724,567,451 kw. hr. were used. This topped the 1929 record by more than 22,000,000 kw. hr. The beginning of operations in the new Ford steel mill and the re-opening of the recently modernized Rouge glass factory accounts for much of the increase. Only about 1,000,000 kw. hr. of the total was purchased by Ford.

Diesel engines for truck use will certainly attain greater prominence in the next year. Following revelations that General Motors would enter the field, possibly with several sizes of diesels for trucks, there comes word that Chrysler, too, is sizing up the possibilities. A six-cylinder Chrysler diesel is practically ready for release, the recent strike having come at a time when many expected to hear the final word.

Latest producer in the automobile line is the Linden, N. J., plant of General Motors. Without announcement, this plant started assembly of Buick, Oldsmobile and Pontiac cars in a small way last week. Assemblies will be stepped up in number after the new lines get running smoothly.

American Foundrymen's Association in cooperation with its Detroit chapter and Michigan State College will hold a sectional meeting, April 9, and 10, at East Lansing, Mich. All meetings will be held in room No. 111-R. E. Olds Hall of Engineering, State College. The general subjects to be covered will be testing of materials, adaptability of gray iron as an engineering material, artificial molding stands and core making.



GRAHAM-PAIGE executives sat in on a telephone conversation in Detroit when dies and machinery purchased from Graham were being put to use in Japan as production started on American-type cars at the plant of Nissan Jidosha Kaisha, Ltd., Yokohama. Shotaro Otake (center), talked 75 minutes at \$10 a minute while the Graham executives looked on. Watching are: Left, R. E. Stone, vice-president in charge of manufacturing; standing, C. H. Richter, director of purchases, and, right, R. Carl Hicks, secretary-treasurer.

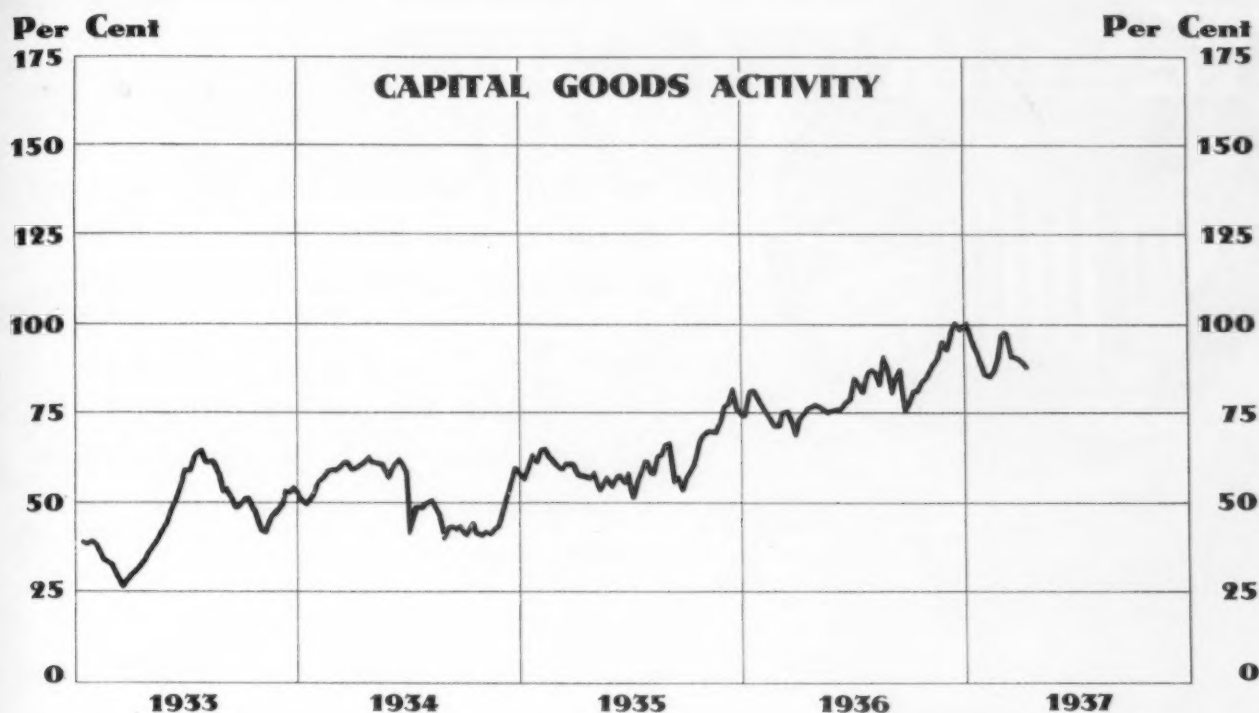
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	February, 1937	January, 1937	February, 1936	Two Months, 1936	Two Months, 1937
Raw Materials:					
Lake ore consumption (gross tons) ^a	4,443,306	4,694,312	2,632,306	5,583,874	9,137,618
Coke production (net tons) ^b	4,283,681	4,629,532	3,293,542	6,743,884	8,913,213
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	2,999,218	3,211,500	1,823,706	3,849,591	6,210,718
Pig iron output—daily (gross tons) ^c	107,115	103,597	62,886	64,160	105,266
Castings:					
Malleable castings—production (net tons) ^d ..	57,295	53,638	40,611	88,809	110,933
Malleable castings—orders (net tons) ^d	60,187	54,070	38,278	82,130	114,257
Steel castings—production (net tons) ^d	92,678	89,649	47,954	92,252	182,327
Steel castings—orders (net tons) ^d	95,693	114,939	51,701	110,720	210,652
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e	4,424,659	4,736,697	2,964,418	6,010,364	9,161,356
Steel ingot production—weekly (gross tons) ^e ..	1,106,165	1,069,232	716,043	701,326	1,086,756
Steel ingot product—per cent of capacity ^f	84.46	81.64	54.67	53.55	82.97
Finished Steel:					
Trackwork shipments (net tons) ^g	8,153	7,246	4,116	7,482	15,399
Sheet steel sales (net tons) ^h.....	.....	.....	138,244	313,049	.....
Sheet steel production (net tons) ^h.....	.....	.....	191,359	414,359	.....
Fabricated shape orders (net tons) ⁱ	88,946	130,651	140,943	261,307	219,597
Fabricated shape shipments (net tons) ⁱ	91,848	92,020	78,203	158,198	183,868
Fabricated plate orders (net tons) ⁱ	30,340	40,424	27,863	66,572	70,764
U. S. Steel Corp. shipments (tons) ^j	1,133,724	1,149,918	676,315	1,397,729	2,283,642
Ohio River steel shipments (net tons) ^k	88,170	96,400	13,782	79,542	184,570
Fabricated Products:					
Automobile production, U. S. and Canada ^l ...	383,637	399,426	300,874	678,180	783,063
Construction contracts, 37 Eastern States ^l ...	\$188,590,800	\$242,844,000	\$140,419,100	\$355,211,900	\$431,434,800
Steel barrel shipments (number) ^m.....	.....	919,290	517,424	1,060,021	.....
Steel furniture shipments (dollars) ⁿ	\$2,071,847	\$2,174,652	\$1,484,145	\$3,070,591	\$4,246,499
Steel boiler orders (sq. ft.) ^o	871,746	651,063	810,387	1,433,751	1,522,809
Locomotive orders (number) ^p	33	46	46	60	79
Freight car orders (number) ^p	10,532	10,881	7,236	8,286	21,413
Machine tool index ^q	165.2	200.3	112.1	†107.1	†207.7
Foundry equipment index ^r	249.5	190.9	110.4	†118.5	†241.2
Foreign Trade:					
Total iron and steel imports (gross tons) ^s	41,628	43,358	43,358	93,847	84,691
Imports of pig iron (gross tons) ^s	11,340	12,434	14,660	29,693	23,774
Imports of all rolled steel (gross tons) ^s	23,134	24,409	18,208	41,166	47,543
Total iron and steel exports (gross tons) ^s	290,987	201,692	213,736	455,366	492,679
Exports of all rolled steel (gross tons) ^s	115,335	110,139	65,947	145,047	225,655
Exports of finished steel (gross tons) ^s	104,007	103,495	62,322	136,576	207,683
Exports of scrap (gross tons) ^s	143,197	68,884	142,165	296,071	212,081
British Production:					
British pig iron production (gross tons) ^t	603,700	650,700	584,700	1,180,200	1,254,400
British steel ingot production (gross tons) ^t	995,900	998,900	938,500	1,851,000	1,994,800
Non-Ferrous Metals:					
Lead production (net tons) ^u	37,451	43,636	34,127	70,423	81,087
Lead shipments (net tons) ^u	50,375	45,718	33,086	67,676	96,093
Zinc production (net tons) ^u	38,010	40,025	36,228	78,145	78,035
Zinc shipments (net tons) ^u	47,591	50,638	39,918	86,386	98,229
Deliveries of tin (gross tons) ^v	7,675	7,615	5,600	12,235	15,290

† Three months' average. * Revised.

Source of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp. ⁱ United States Engineer, Pittsburgh; ^j When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; ^k F. W. Dodge Corp.; ^l Railway Age; ^m National Machine Tool Builders Association; ⁿ Foundry Equipment Manufacturers Association; ^o Department of Commerce; ^p British Iron and Steel Federation; ^q American Bureau of Metal Statistics; ^r American Zinc Institute, Inc.; ^s New York Commodities Exchange.



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(1925-27 Average = 100)

Last week	87.5	Same week 1933	31.5
Preceding week	89.2	Same week 1932	37.4
Same week last month	91.1	Same week 1931	73.3
Same week 1936	74.5	Same week 1930	103.2
Same week 1935	57.7	Same week 1929	130.3
Same week 1934	60.6		

ACTIVITY in the production and distribution of durable goods showed a further decline last week, according to THE IRON AGE's seasonally adjusted index of this business. The index receded 1.7 points from the preceding week to 87.5 per cent of the 1925-27 average, but remained 13.0 points above its corresponding level a year ago. Last week the decrease was caused almost entirely by the two-day stoppage of work among bituminous coal miners following termination of the old contract. Upon its renewal, production of coal climbed back almost immediately to former levels.

Aside from this interruption, which seriously affected the separate index of industrial operations in the Pittsburgh area, there were no appreciable changes among the five seasonally adjusted series used in computing the general activity index. The

index of steel ingot production was unchanged both before and after adjustment. Lumber shipments rose fractionally, but, although construction awards gained considerably, the index of the volume of this work currently underway showed little or no change after adjustment. The automobile production index rose nearly a point after seasonal correction.

Actual figures used in calculating the index last week are shown below for all five series.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	91	0
Automobile production (number of cars and trucks)	100,470	+2,760
Railroad loadings of forest products (number of cars)	38,609	+436
Pittsburgh industrial production and shipments (index number)	104.4	-9.9
Construction contracts awarded (total value)	\$50,778,000	+\$16,100,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

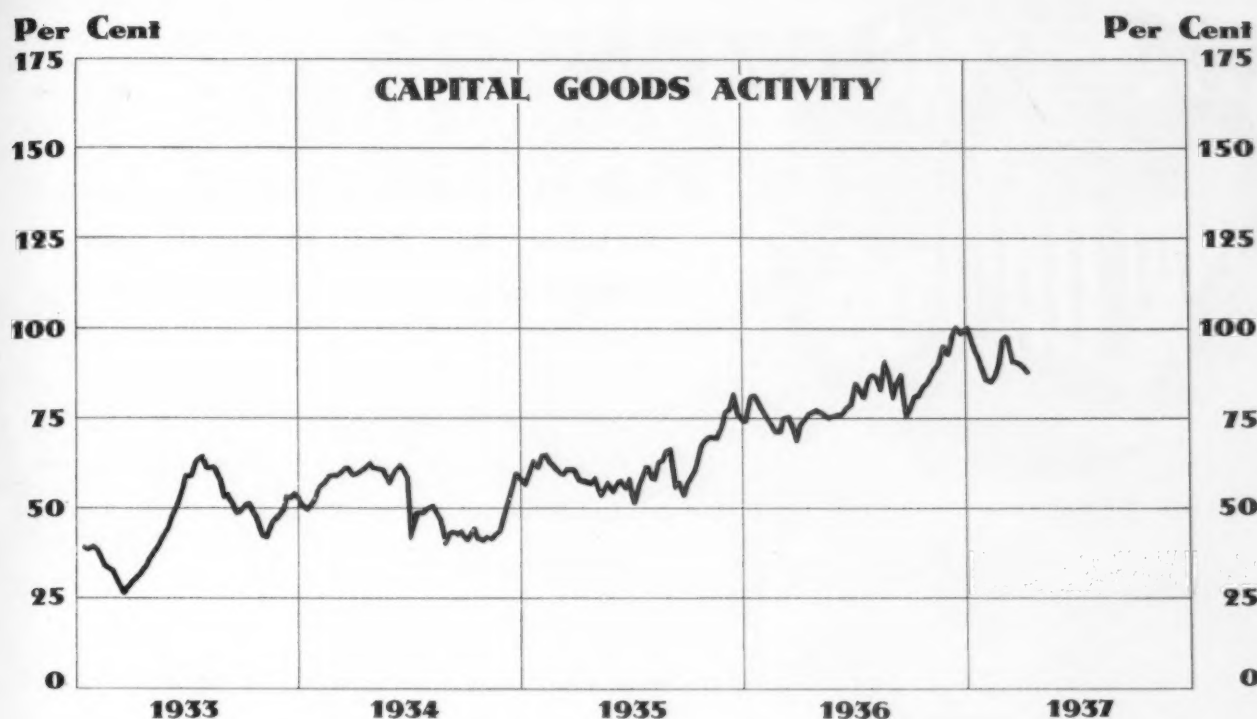
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WASHINGTON



... New NRA bill proposed by Siegfried Hartman, New York lawyer — Said to have backing of Major George L. Berry.

. . .

... Congress puts through innocuous resolution on sit-down strikes—Dies resolution to investigate such strikes creates much excitement in House.

. . .

... Senator McAdoo proposes Senate committee to bring about peaceful discussion between management and labor in labor strife.

By L. W. MOFFETT

*Resident Washington Editor,
The Iron Age*

. . .

WASHINGTON, April 13.—Resurrection of the NRA is being planned by the administration. This at least was the statement of Siegfried Hartman, New York lawyer, who claimed authorship of a bill to bring industrial regimentation back into being. He revealed that he had prepared such a bill at the behest of Major George L. Berry, "industry coordinator," and said that Berry had presented the plan to the President. The President, according to Hartman, studied the proposal during his South American trip, and is expected to get a report on it from the Department of Justice within a short time. The administration itself is silent on the subject.

Hartman told of the move to restore the NRA in course of testimony he gave before the Senate Committee on the Judiciary in

opposition to the administration "court reform" program. Explaining the NRA legislation which is to be proposed, Hartman said it would escape attack under the "due process" and "interstate commerce" clauses of the Constitution. It was these clauses and not a "reactionary" Supreme Court, Hartman maintained in opposing the "court reform" bill, which brought about the demise of the Blue Eagle. Hartman said the NRA was killed because of "inferior" draftsmanship of the original NRA.

Features of Proposed Bill

Aside from legal objections, said Hartman, NRA met with opposition because it provided a bureaucratic control of industry, no protection for minorities opposing codes and because it levied a direct tax on the several members of each industry to support code administration. NRA, he said, was held invalid because it involved unconstitutional delegation to the Executive of legislative power and an attempt to control intrastate business in violation of states' right. The due process clause, he pointed out, does not permit direct legislative regulation of wages and

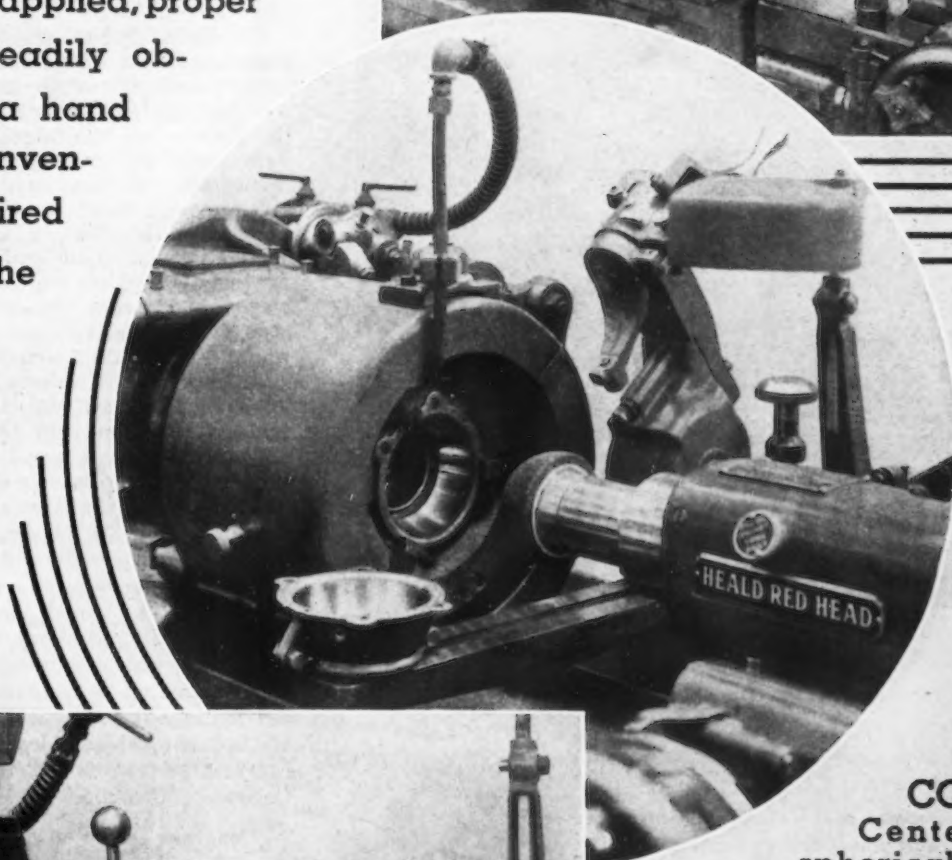
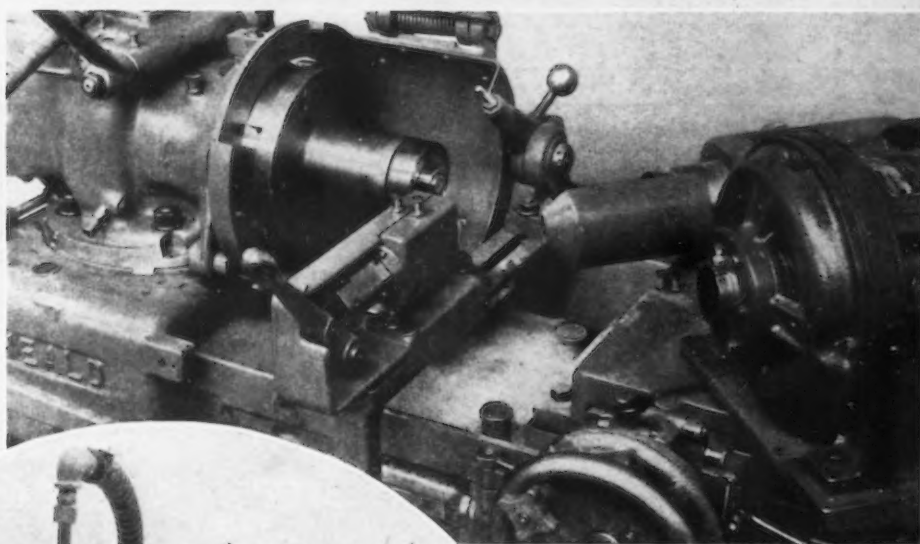
hours. But he stated that this difficulty has been greatly relieved by the decision of the Supreme Court sustaining the Washington minimum wage law. He cited the words of Justice Cardozo in the Schechter case (NRA) that there would have been no unlawful delegation of functions if the statute had prescribed the fairness of competition as a standard for testing provisions of codes. The formula, said Hartman, is fair competition. Hence, he pointed out, a comprehensive fair competition act should be adopted prohibiting all forms of unfair business methods (1) in interstate commerce or (2) in competition with transactions in interstate commerce. The proposed statute covers (1) all forms of deception of the public by persons engaged in interstate commerce (2) all forms of competition heretofore held to be legally unfair, and (3) certain other practices in competition now generally held unfair, including such practices as price discrimination, selling below cost, use of sweatshop goods or child labor-made goods in interstate competition with non-sweatshop made goods.

Congress would not be fixing

GRINDING with FORMED wheels

WHERE there are surfaces to be finished that require a formed wheel, the Heald No. 75 Internal has proven to be ideally suited for this type of work.

Special wheel truing devices can be easily applied, proper cross feed readily obtained and a hand feed gives convenient and desired control for the table.



ANGULAR SURFACE

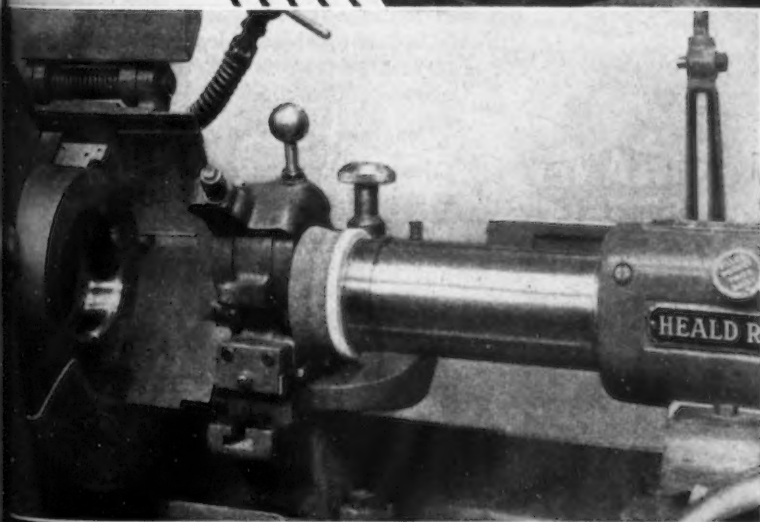
Above—Arrangement of units on a No. 75 Internal with a wheel having two angular cutting surfaces that permit the grinding simultaneously of the O. D. and adjacent face of a clutch hub.

CONVEX SURFACE

Center—Grinding the spherical seat in universal joint housing caps by use of a formed wheel. Plunge cut is used.

CONCAVE SURFACE

Left—No. 75 Internal arranged with special form truing device for shaping the wheel to the draw die contour so that the entire draw surface of the die can be ground with a single wheel in a single operation.



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wages, said Hartman. Delegation of legislative power to the Executive, he contended, would be overcome by having the statute affirmatively specify certain general standards for determining in each case the propriety of labor conditions involved. This last difficulty, called the "most baffling," would be overcome, Hartman said, by "focusing the incidence of the law upon the competition between goods after one or both have actually entered the current of interstate commerce."

Congress, he said, would simply say that once sweatshop or child labor-made goods have come under Federal jurisdiction it will forbid sale of the goods "not absolutely but in competition with the higher-standard-made goods. Industries would set up their codes, he said, to be approved by the Government and the codes would be prima facie evidence in lawsuits or standards to be maintained.

The Hartman observation as to a proposed NRA received close attention. What may develop from

the suggested legislation remains to be seen. The difficulty is that there have been so many proposed drafts of new NRAs that confusion arises as to what the administration has in mind. Until it says definitely what specific plan, if any, it has it is not possible to know what form new NRA legislation will take. But it will be proposed at the present session. The fact that Berry is credited with having had the measure drafted gives some weight to the Hartman proposal. On the other hand, the fact that Hartman opposes the administration court packing plan tends to cause the proposal to be discounted. Berry, super-propagandist as head of Labor's Non-Partisan League, is an ardent advocate of the court plan and is arranging to ballyhoo the program throughout the country through regional meetings of League groups. The fact that Berry also is the "industry coordinator," making him a Government official at the same time he is a most active politician, discredits much he is doing to revive NRA.

Hardly had Hartman told of plans for a new NRA than another plan to regulate wages and hours was sprung in Congress. It took the form of a bill introduced by Representative Howard W. Smith, Democrat, of Virginia. It was given enough weight by the House Committee on the Judiciary to order hearings on the measure. It provides for the regulation of wages and hours through State laws with Federal enforcement where interstate commerce is affected. The bill reflects a growing action of state legislatures to set up wage and hour laws, and undoubtedly has a great deal of backing by many industries. Somewhat similar to the Hartman plan, the Smith bill would prohibit interstate transportation of goods and merchandise produced under conditions that would have made their production unlawful in the state into which they were consigned. Invited to the hearings on the Smith bill are representatives of industry, labor leaders and representatives of the Interstate Commerce Commission.

Congress Ducks on Sit-down

Meanwhile, Congress is sitting down lightly on the red-hot sit-down strike situation, its eye peeled to political repercussions, while the White House is staging a silent strike on the boiling issue, declining to comment on it one way or the other. And as a means of letting the White House keep out of hot water obliging Senate leaders have put through a resolu-



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tion condemning both the sit-down strikes and "unfair" industrial practices. It was sponsored by Senators Pittman and Robinson and offered a joint resolution for concurrence by the House. Therefore it would not require White House action. It could still remain noncommittal. And being an innocuous gesture, its passage would not put its supporters in labor's doghouse. Moreover, it steered clear of this fear of political danger by tying industry in the resolution in the way of condemning so-called "unfair" industrial practices. The House Labor Committee now is considering the Senate resolution.

But when it comes to really taking a hard-and-fast stand against the sit-down strike, Congress develops a bad case of jitters. This was reflected in the storm in the House over the resolution of Representative Dies, Democrat of Texas, to investigate sit-down strikes. Investigation of labor espionage was political meat for a Senate committee, but investigation of the sit-down strike is avoided as political dynamite. Hence the House thundered down the Dies resolution. It was tabled upon motion of Representative Lindsay C. Warren, Democrat of North Carolina, by a resounding voice vote. The motion to table the resolution followed an overwhelming vote to throw the resolution open to amendment—in other words to clutter it up with confusion in order to avoid the issue.

The House worked itself into a near-riotous state when the Dies resolution was brought to the floor. Amid the fireworks, threatened fist fights and general disorder, Dies, however, declared in substance that a vote against the resolution was a vote for sit-down strikes.

"If we defeat this resolution we may explain until we are black in the face, but there is only one explanation that the thinking people of America will accept and that is that we are unwilling to meet this bold challenge which has been hurled into our very face," said Representative Dies.

Dies was laughed down. The demonstration offered its own commentary on the political truckling of Congress to a situation which the Premier of Ontario said has almost developed anarchy in the United States.

McAdoo Proposes Peace Board

Senator McAdoo, Democrat, of California, has attempted another approach on the ticklish subject of sit-downs, hoping to bring labor and industry together in a

nice, peaceful discussion to bring an end to the sit-down. Senator McAdoo has proposed a Senate investigation calling for the appointment of a committee of five Senators to confer with leaders of industry and labor "with a view to the elimination of industrial strife and the promotion of the general welfare." Somewhat mealy in character, the resolution would provide simply for a "conference" method of "improving relations between industry and labor." There would be no public hearings. The

Senate committee would apparently be some sort of a pacifying influence—perhaps. Also perhaps it would be anything but that, depending on the committee membership. The resolution was tabled. It was described as being an "independent" move, evidently for the purpose of absolving the administration of having any part in it. McAdoo voted against the defeated amendment condemning the sit-down strike, which Senator Byrnes had tried to tack on the Vinson-Guffey coal bill.

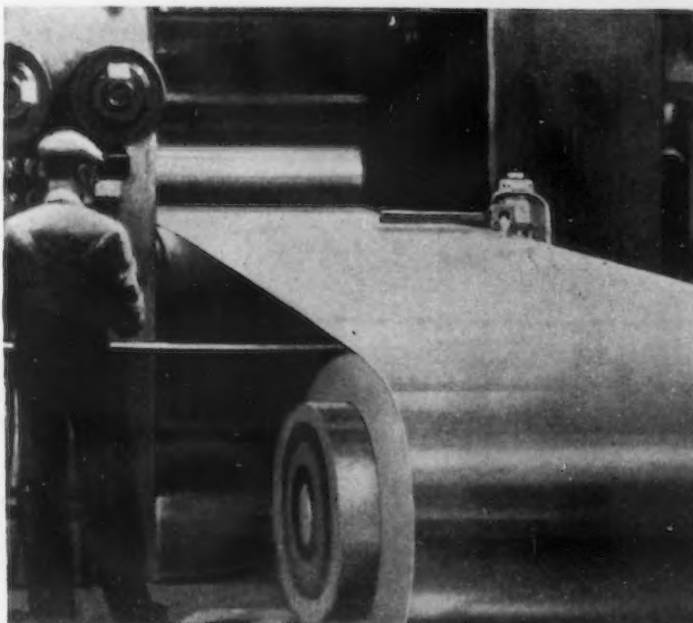


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Higher Freight Rates On Heavy Commodities In a Separate Case

WASHINGTON, April 13.—For the purpose of expediting the general freight rate increase case, the Interstate Commerce Commission has granted the petition of the railroads to consider as a separate case proposed increased rates on heavy commodities, such as steel, coal, coke, ore, petroleum, etc. The next hearing will be held in Chicago, April 22, covering basic products. Whatever testimony may be given by shippers as to proposed rate increases in steel will be only of a "clean-up" kind inasmuch as a hearing date on steel had been set at the Washington proceeding but no testimony was offered in protest.

Considerable objection was made by interior blast furnace interests, including steel companies, to the proposal to add increased rates on iron ore on shipments both from the mine to Lake docks and from Lake docks to the furnaces. One scrap dealer protested against proposed scrap rate increases.

The commission has set June 16 as the date for oral arguments on basic commodities.

"The remaining issues on this proceeding," said the commission, "will not be heard prior to the submission of the so-called heavy commodity list."

Floating Dry Dock Bids Too High

WASHINGTON, April 9.—Because they exceeded the available appropriation of \$750,-

000, the Navy Department on April 5, rejected bids for the construction of a small steel floating drydock for Pearl Harbor, P. I. The lowest bid was submitted by the Dravo Contracting Co., Pittsburgh, whose base figure was \$1,182,000. The navy department is expected to ask for an increased appropriation.

The Newport News Shipbuilding & Dry Dock Co., was the lowest bidder on a liner to replace the Leviathan. It submitted three bids on as many designs, as follows: New York ship design, \$14,375,000; Gibbs & Cox design, \$15,455,000, and Newport News design, \$14,560,000. The bids were opened April 1, by the United States Maritime Commission.

"Collusive Bidding" Report Due Soon

WASHINGTON, April 13.—President Roosevelt said last Friday at a press conference that he expects to receive a report in about two weeks from the Department of Justice in connection with its investigation regarding alleged collusive bidding on sheet steel piling contracts for PWA projects. The subject was turned over to the department after a report had been made to the White House by the Federal Trade Commission, which charged collusive bidding. Complaint of "identical bidding" was made originally by Public Works Administrator Ickes.

When the matter was turned over to the Department of Justice, about one year ago, the President asked that it make an investigation under the anti-trust laws and take whatever "appropriate action" that was considered necessary. The FTC charged that the basing point

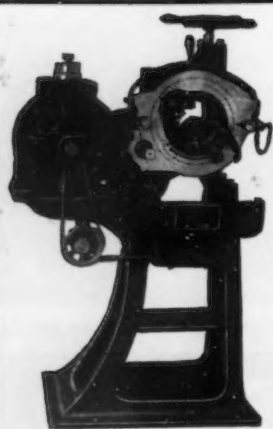
system was responsible for the alleged collusive bidding but inaction so far by the Department of Justice has indicated that it has not found reason to support FTC recommendations for prosecution. Attorney General Cummings also said recently that it was difficult to prove violation of the anti-trust laws. It also is a matter of interest that Donald Richberg, close Presidential adviser, is working with the Department of Justice on the case. Mr. Richberg has consistently upheld the principles of the basing point system in the steel industry in striking contrast to the attitude of the FTC.

President Roosevelt, who has complained of prices of steel, copper and cement, again last week pointed to so-called high prices of materials as reasons for rejection by the Navy Department of bids on a large and a small floating dry dock. The bids exceeded available Navy appropriations. Estimates made by Navy Yards themselves also exceeded the appropriation available for the large floating dry dock.

As a result of the bids, President Roosevelt said he has asked the Navy Department to make a complete report on the situation and to take into account the matter of new designs for the dry docks with a view to lowering costs of construction.

Coal Bill Passed; Awaits Signing

WASHINGTON, April 13.—Subjecting steel-owned captive mines to its provisions, the Vinson-Guffey coal bill conference report has been approved by both the House and the Senate and now remains only to be signed by the



No. 442 Motor Driven.
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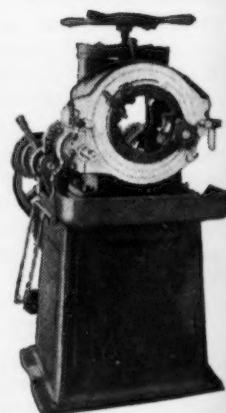
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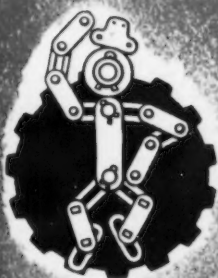
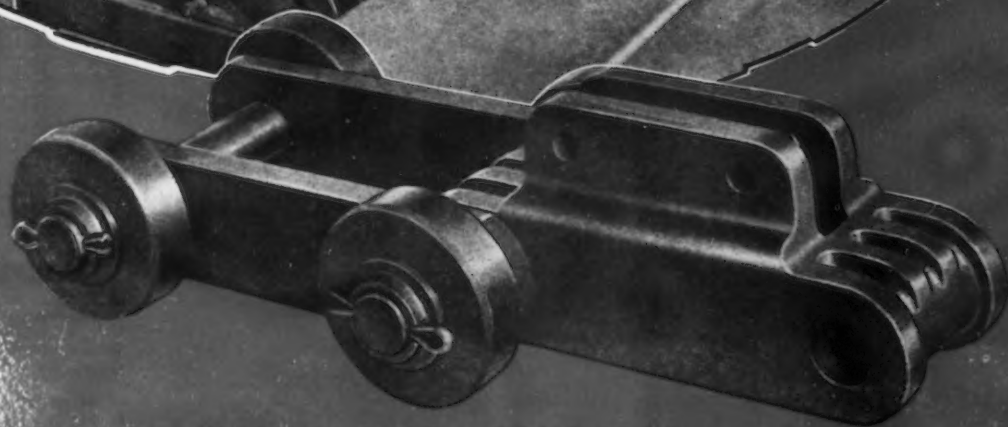
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DESIGNED to withstand intense heat, the Jeffrey 1380-Series steel mill chains are giving a good account of themselves in severe, continuous conveyor service . . . on pack-and-pair furnaces . . . sheet bar furnaces . . . and normalizing furnaces.

These chains are built to retain their strength through a long service life. Two end ribs in the block links add reinforcement where most needed. This and other features of

correct design, with precision manufacture, permit the chain strands to travel level in the guides and to pull with equal tension. Sheets consequently are carried through the furnace with minimum movement on the fingers.

There are four variations of design and composition in this 1380 Series. Let Jeffrey recommend the best chain for your furnace. Then try it and be convinced.

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THE JEFFREY MANUFACTURING COMPANY, 889-99 North Fourth Street, Columbus, Ohio



President to become a law. The bill, setting up an NRA for the bituminous coal industry, was sponsored by both the United Mine Workers and a small group of coal operators. It replaces the Supreme Court-invalidated Guffey coal act, knocked out because of its labor provisions. The present bill does not carry any labor provisions.

The House conferees successfully opposed the amendment of Senator Bulkley, adopted by the Senate, which exempted captive coal mines

from provisions of the bill. The amendment had the support of steel manufacturers. The legislation will become effective immediately upon signature of the President. Contracts made prior to June 16, 1933, are exempt from the act. The bill carries the amendment offered by Senate Majority Leader Robinson providing for a tax of 1c. per net ton instead of the original one-half of 1 per cent of the market price at the mine. The penalty provision of \$1 a ton against pur-

chasers of coal who buy in violation of the code was eliminated. The bill provides for an excise tax of 19½ per cent of the fair market value of coal at the mines when sold in violation of the code.

The act will be administered by the National Bituminous Coal Commission.



....PIPE LINES....

Texas-New Mexico Pipe Line Co., care of R. B. McLaughlin, 1910 Arbor Street, Houston, Tex., secretary and treasurer, recently organized with capital of \$15,000,000, will take over main welded steel trunk line of Texas Pipe Line Co., in west Texas and New Mexico, used for crude oil transmission, as well as other pipe line properties in same area of companies of which it is a joint interest, and will carry out expansion and improvements. Trunk line noted will be increased from 30,000 to 60,000 bbl. per day, and number of booster stations will be built along route. New company has been formed as a joint pipe line subsidiary of Texas Pipe Line Co., Houston Sinclair-Prairie Pipe Line Co., Oklahoma City, Okla.; Empire Pipe Line Co., and Tide Water-Associated Pipe Line Co., both Tulsa, Okla. B. H. Hull is president.

Quartermaster, Air Base, Selfridge Field, Mich., asks bids until April 20 for steel pipe (Proposal 828-22).

Consolidated Gas & Electric Co., San Diego, Cal., plans 6-in. submarine cast iron pressure pipe line for gas transmission in anchorage area in San Diego harbor.

Shell Pipe Line Co., Shell Building, St. Louis, a subsidiary of Shell Oil Co., same address, has authorized surveys for new 6-in. welded steel pipe line in west Texas oil field for crude oil transmission, extending from Barnsley, where company has large pumping station, for distance of about 50 miles. A number of pumping stations for booster service will be built along route. Cost over \$500,000.

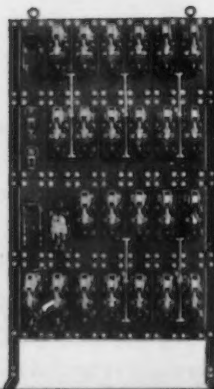
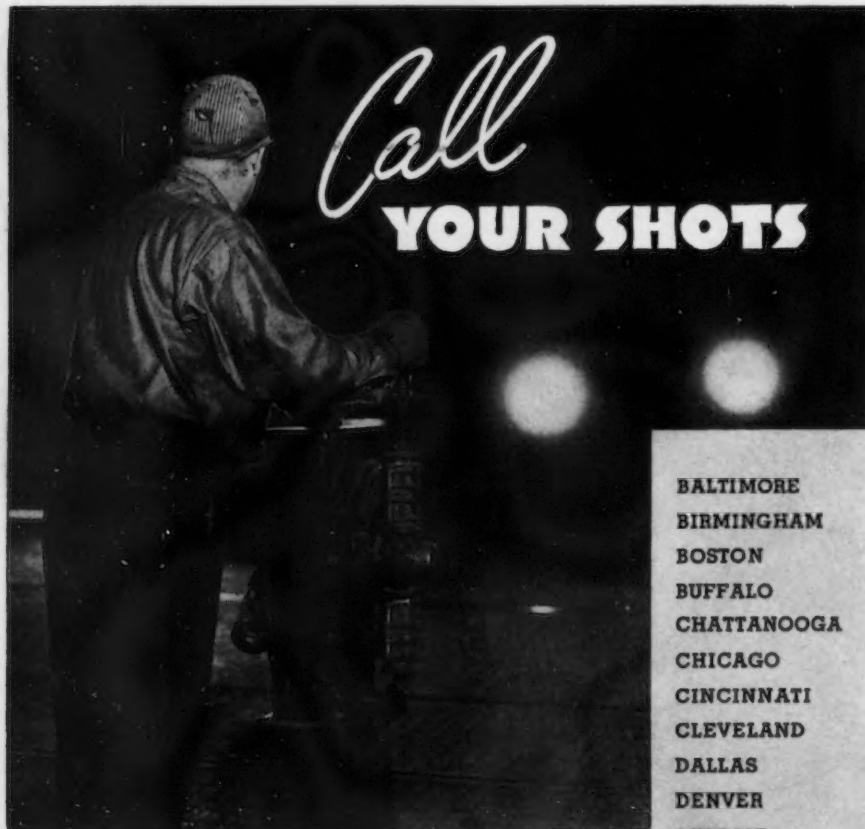
Anderson-Fritchard Oil Corp., Oklahoma City, Okla., plans about 11,500 ft. of 4-in. welded steel pipe in N. E. Sixteenth Street, Oklahoma City, for crude oil transmission.

Mason Oil Co., Loving, Tex., has authorized new 4-in. pipe line, using pressure screw joint cast iron pipe, from oil field district near Loving to point about 12 miles distant, where connection will be made with main pipe line of Pasotex Pipe Line Co.

Chicago opens bids April 15 on 270 ft. of 24-in. steel pipe, ¾ in. thick.

Eureka, Cal., will soon call for bids on approximately 60,000 ft. of 18 to 24-in. pipe line.

The General Electric machine tool "speed" show, a traveling presentation of the latest electric equipment for machine tool application, will open at the Hotel Bancroft in Worcester, Mass., on May 17. The show, which lasts one full day and to which New York and New England machine-tool builders have been invited, will stress the importance of higher production speeds with greater accuracy.



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Up to 20 Tons of Steel Used On a Well-Equipped 150-Acre Farm

TO equip a 150-acre grain and dairy farm with a full complement of agricultural implements and equipment made of steel would require nearly 20 tons of steel, according to the American Iron and Steel Institute.

Almost 15,000 lb. of steel would be used in fencing the farm, if all-steel fence were used, while more than 21,000 lb. would consist of the steel in the agricultural implements, both machinery and hand tools, suggested by farm authorities as ideal equipment for a 150-acre farm raising principally grains and potatoes. Steel would also be used in dairy equipment and for various miscellaneous uses about the farm.

An average of 1400 rods of fence is found on a farm of 150 acres, according to agricultural experts. If about three-quarters of the fence were woven wire fencing and the remainder of the three-strand, barbed wire type, about 12,000 lb. of steel would be required, not including about 500 lb. for poultry netting. Steel posts, placed 15 ft. apart, would weigh 2000 lb.; steel gates about 200 lb.

A farm of 150 acres equipped with all the agricultural implements suggested by farm authorities as ideal for a grain and potato raising farm of this size would have one all-purpose tractor, containing about 3500 lb. of steel and four plows and harrows of various types, totaling nearly 3000 lb. of steel. In addition there would be a potato digger, hayloader, grain binder, corn binder, ensilage cutter, manure spreader and several other implements containing from 75 to 2250 lb. of steel each. The total weight of steel in the farm implements would be close to 21,000 lb.

Miscellaneous hand tools, such as scythes, axes, pitchforks, shovels, hoes and other tools, would contain about 250 lb. of steel.

The steel in dairy equipment necessary for a herd of 10 cows is estimated at over 1000 lb. Milk cans would be available to hold twice as much milk as one day's production because of the shipment of milk and cans between the farm and the creamery. On the basis of 3 gal. of milk per day from each cow, six 10-gal. cans would be necessary, weighing a total of 170 lb.

Milk pails, strainers and such other miscellaneous equipment

would contain almost 100 lb. more steel, while steel stanchions for holding 10 cows in the barn would weigh 750 lb.

The total of more than 37,000 lb. of steel used in these farm implements and equipment does not in-

clude the nails, pipe or other products widely used in the construction of farm buildings, and is exclusive of the steel in personal and household possessions.

"Large additional demand for steel from rural areas would develop if the ideal farm equipment described could become standard for farms of this type, and if the equipment recommended as ideal for other sizes and types of farms could be generally adopted," says the institute.



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lowers die cost and makes it possible to gain benefit of rolled steel strength for small quantity purchases.

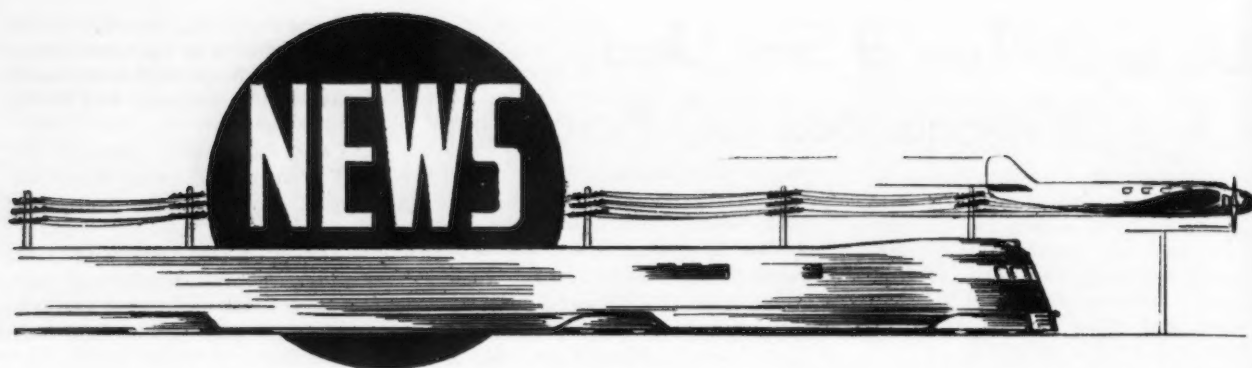
The channel of this inclinator frame is pressed steel 3' deep and $\frac{1}{8}$ " thick. The lugs and bosses are welded in place.

Parish engineers consider all phases of the problem; appearance, strength, improved design, and production methods leading to minimum costs.

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Republic Steel Formally Takes Over Gulf States Steel Properties

REPUBLIC Steel Corp. has completed the acquisition of the Gulf States Steel Co., following approval last week by the Gulf States stockholders of the terms of purchase, which include assumption by Republic of Gulf States bonds and other indebtedness and the exchange of Republic common stock for Gulf States common stock in the ratio of two and one-third shares of Republic for one share of Gulf States.

The Gulf States plants will be run as an operating district of Republic, which will be known as the Gulf States district. L. E. Geohegan, who was vice-president and general manager of Gulf States, will be in charge of operations in the new district as district manager. The sales organizations of the two companies will be merged. Present operations in the Birmingham district will continue under

the direction of Wade Oldham, Birmingham district manager. Principal products of the Gulf States plants are bars, plates, sheets and wire products.

"The addition of Gulf States plants and properties will greatly strengthen Republic's position in the South," said T. M. Girdler, chairman and president of Republic, in commenting on the purchase. "At Birmingham Republic has had ample iron ore supplies and pig iron capacity but hitherto has had no steelmaking facilities in the South. The Gulf States plants at Gadsden furnish these facilities. Republic's furnaces and mills at Birmingham and Gulf States' mills at Gadsden supplement each other and the operation of both under Republic management will effect substantial economies.

"It is my belief that the South

is entering upon a period of increasing industrial activity and that within a few years it may consume very considerably more steel than it does today. With the Birmingham and Gadsden plants and properties working in conjunction Republic will be in an excellent position to take advantage of these expanding markets."

Labor Problems to be U. S. Chamber Subject

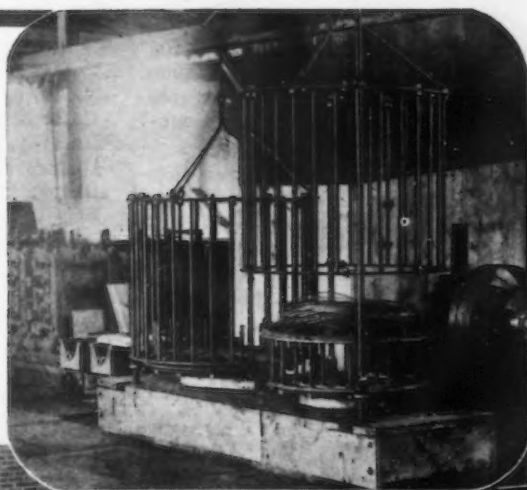
CURRENT labor problems will occupy a prominent place on the program of the twenty-fifth annual meeting of the Chamber of Commerce of the United States, to be held in Washington, April 26-29.

At a special group session on, "Management Relations with Employees," to be held April 27, consideration will be given, both through scheduled addresses and discussion from the floor, to such points as the obligations of employers in maintaining harmonious

NEWS AND MARKET INDEX

Personals	78	New York Market	100
Obituary	80	Fabricated Steel	102
Steel Ingot Production	88	Non-ferrous Market	103
Summary of the Week	89	Scrap Market and Prices	104-105
Pittsburgh Market	90	Finishing Iron & Steel Prices	106-107
Comparison of Prices	91	Warehouse Steel Prices	108-109
Chicago Market	94	Pig Iron & Raw Material Prices	110
Philadelphia Market	96	Machine Tool Activity	112
Cleveland Market	98	Plant Expansion & Equipment	113

Progress in POURING REELS by Morgan



The modern Pouring Reel, as developed by Morgan, forms symmetrical coils at high speeds. The rod is "poured" onto a revolving plate, between two concentric rows of vertical pins, and is laid in the coil without twisting. For this reason the Pouring Reel is essentially suitable for coiling sections other than round—and particularly for nut flats.

The stripper and push-off mechanisms are driven from a single motor, and their



movements are mechanically synchronized.

Contrast the belt-driven model, used in 1886, with this modern installation, efficiently receiving rod from two high-speed finishing trains.

Development by Morgan is always complete. Even the simplest problems are anticipated and solved before the mill is actually built, with the result that trial and error methods are unnecessary. An ounce of prevention can mean extra tonnage.

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THE IRON AGE, April 15, 1937—73

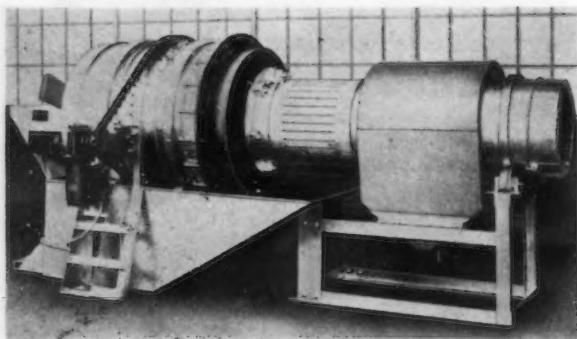
labor relationships; methods for increasing responsibility of labor organizations, and the proper role of the Government in labor controversies.

The chairman and discussion leader at this conference will be James W. Hook, president, Geometric Tool Co., New Haven, Conn., and also president of the New England Council. The accomplishments of employers in improving working

conditions and advancing the interests of employees will be discussed by B. C. Heacock, president Caterpillar Tractor Co., Peoria, Ill. Mr. Heacock now heads the Illinois Manufacturers Association. Proper methods for negotiation between management and workers will be the subject of an address by Homer L. Ferguson, president, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

In both addresses attention will be directed to the possibilities and limitations of further governmental regulation of terms of employment.

On April 28 there are to be addresses by spokesmen for the Government and business. Edward F. McGrady, Assistant Secretary of Labor, will discuss proposals for a national labor policy, from the standpoint of the administration. The management point of view on the same subject will be presented by P. W. Litchfield, president, Goodyear Tire & Rubber Co., Akron, Ohio.



It Pickles in Batches

New Ideal Rotary Batch Pickling Machine

Here's a typical Ideal Rotary Batch Pickling Machine installation. Heat treated parts, forgings, etc., are pickled, drained and rinsed in this unit. Slow rotation of the drum gently agitates the work in the acid. This results in rapid and thorough descaling of difficult work. Reversing the rotation of the drum automatically discharges the work through the draining and rinsing screen. Drum is covered and lined with acid and abrasion resisting rubber vulcanized to the metal.

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Gives Data on J-Metal Tools

USEFUL information on the machining of various materials with Haynes Stellite J-Metal cutting tools is contained in a 52-page booklet being published by the Haynes Stellite Co., Kokomo, Ind. Separate sections are devoted to recommended speeds and feeds for machining a variety of materials; proper tool grinding procedures and wheel selection; and to standard and special tools, including welded tip tools. Hard facing applications in the machine shop, including the hard surfacing of cams, dogs, slides, shear blades, dies and gages, to provide greatly increased life of wearing parts, are also discussed. Hardness conversion charts and S.A.E. steel specifications are given in an appendix. The booklet contains more than 60 illustrations of tools and machining operations, as well as a number of tables and charts.

Dr. Kinzel to Address Chicago Metal Men

SEVERAL hundred Chicago members of the American Society for Metals are expected to journey to South Bend on Saturday afternoon, April 24, at the invitation of the Metallurgical Department of the University of Notre Dame.

Dr. E. G. Mahin, head of the Department of Metallurgy at the university, will introduce Dr. A. B. Kinzel, chief metallurgist, Union Carbide & Carbon Research Laboratories, Inc., who will speak on, "Some Specific Effects of Deoxidizing and Alloying Additions to Steel." An inspection trip will be made through the laboratories of the university preceding the dinner and meeting.



DUNBAR BROS. CO.
DIVISION OF ASSOCIATED SPRING CORPORATION BRISTOL CONNECTICUT

Tool Engineers Society Holds Annual Meeting in Toledo

THE fifth annual meeting of the American Society of Tool Engineers was held at the Waldorf Hotel, Toledo, April 8, with an attendance of about 125. Business sessions were followed by dinner. The outside members were guests of the Toledo chapter during the meeting.

The society has grown rapidly, now having 10 chapters and 1400 members.

The problem of the tool engineer is to produce parts in large quantities, at low cost within rather closely limited tolerances of accuracy, as stated by Ralph Carpenter, vice-president, Spicer Mfg. Co., and the principal speaker at the meeting. Mr. Carpenter recalled his early days at the Taft-Peirce Mfg. Co. of Woonsocket, R. I., where the tools were made for the interchangeable manufacture of the original Cadillac one-lunger back in 1907. It was regarded as quite a sensation when six of the cars were taken to England, disassembled before a distinguished gathering and the parts reassembled indiscriminately. In those days every automobile plant had a crew of "fitters" who put the car together by filing and scraping the parts to fit.

Mr. Carpenter then related an experience in England during 1915 when he was soliciting gun business for the Pratt & Whitney Co. In visiting the Woolwich arsenal, he found no working drawings for the then famous Enfield rifle, which was being produced at the hopelessly slow rate of 2500 a week. There was a single dimensional assembly drawing in the vault, and all parts were made to gages. It was necessary for the Pratt & Whitney Co. to average the measurements on 20 guns before equipment and tooling could be made for real quantity production to arm a million men.

The tendency today is toward the continuous process in manufacturing in order to reduce handling costs, which Mr. Carpenter considered the biggest single item of expense. Back in 1908 Gillette safety razor blades were made in single pieces, using pneumatic suction cups to transfer the thin stampings from sub-press die to sub-press die and between grinding and honing operations. At present the blades are completely processed while held in the strip form, and

in the final operation are blanked from the strip.

Mr. Carpenter expressed the belief that we haven't scratched the

surface of the possibilities of interchangeable precision manufacture. With rising labor costs, it has become more necessary than ever for tool engineers to keep down costs in order to maintain the market for consumer goods.

At the meeting, officers of the newly created Toledo chapter were installed, R. M. Lippard, Detroit manager of the Heald Machine Co.,

TRIPLE COMPRESSION SCRAP BALERS



STYLE
100 TC
(100 x 51 x 36)
and other sizes

Also Regular
Double
Ram Presses
in all sizes



GALLAND-HENNING MANUFACTURING COMPANY

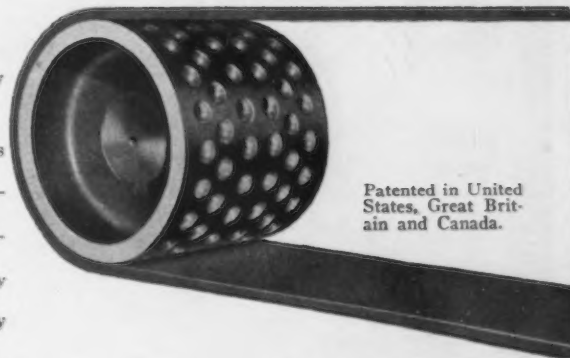
2724 S. 31st Street Milwaukee, Wisconsin

COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

This Pulley Revolutionized FLAT BELT Performance...

TEN BIG POINTS

- 1 Belt slippage eliminated.
- 2 Belt sealed to pulley by Vacuum Cups.
- 3 Belt "slap" eliminated.
- 4 Tight stretching of belts unnecessary.
- 5 Life of belt greatly increased.
- 6 Use of belt dressing unnecessary.
- 7 Production noticeably stepped up.
- 8 No power loss on heavy shock loads.
- 9 No pulley maintenance expense.
- 10 Vacuum Cup Pulleys never wear out.



Patented in United States, Great Britain and Canada.

Pick out your toughest job
and order a pulley on our 30-
Day Free Trial Offer

VACUUM CUP METAL PULLEY CO., INC.

1010 FORD BLDG.

DETROIT, MICH.

"A Belt Never Squealed on a Vacuum Cup Pulley"

administering the oath of office. Otto W. Winter, industrial engineer, Kent-Owens Machine Co., and for the past year chairman of the Detroit chapter, is now chairman of the Toledo group. Gus Ehrhart, Spicer Mfg. Co., is vice-chairman; J. Rennell, also of Spicer, is secretary, and W. Franklin, of the Electric Auto-Lite Co., is treasurer. The national officers were also installed. Their names were published on p. 76 of the April 1 issue of *THE IRON AGE*.

World Scrap Situation Reported Serious

IN view of the campaign being undertaken by the Independent Steel and Iron Producers Committee on Scrap to obtain legislation in Congress to license exports of scrap iron and steel, reports on the scrap situation in various foreign countries, received by the Department of Commerce from commercial attaches abroad, are of interest.

From France comes word that

the 20 franc a ton export tax imposed by the government some months ago and intended to make this outward movement prohibitive has proved insufficient and the levy has been increased to 30 francs, with the prospect of further governmental action on the scrap iron situation likely at "any moment." Exports during February amounted to 38,888 tons compared with 32,600 tons in the same period of 1936. It is said to be practically impossible to find material being offered for sale in the domestic market and prices are steadily advancing.

High freight costs are causing apprehension among dealers and collectors in Germany, as inadequate profits are feared, in spite of a heavy demand for scrap because of the high steel output. Supplies are said to have become more regular since dealers and customers in the Rhenish-Westphalian district adjusted their business to the maximum prices, as fixed by a governmental decree, for open-hearth and blast furnace scrap.

Meanwhile in Czechoslovakia cast grades have increased sharply in price as a result of heavy demand from foundries, caused par-

tially, no doubt, by the world scarcity of pig iron.

Imports of scrap into Italy during January, 1937, totaled 44,777 tons, of which 37,803 tons, or 84.4 per cent, was shipped from the United States.

In the Far East, Japan, probably the world's greatest buyer of scrap, is understood to be considering the formation of a company for the joint purchase of scrap, all steel plants to be stockholders. With heavy domestic construction demands bolstering the tremendous program for armaments, Japanese needs for old materials are so serious that many of the boats that have been chartered to carry scrap across the Pacific have been purchased outright and scrapped themselves.

A CORRECTION

On page 105 of the April 8 issue of *THE IRON AGE* the word "monel" in the heading of the story concerning the display of the United States Steel Corp. at the railway appliances exhibition in Chicago was incorrectly printed and was intended to read "novel."

"ROTABINS"



ROTABINS WITH SHELVING

Save 50% Floor Space

NO MORE WAITING AT THE STOCK-ROOM WINDOW

The gang doesn't hang around the stock-room window any more since the company installed "ROTABINS". They speed up things, not only for stock and tool crib attendants, but for every mechanic.

SAVE TIME — LABOR — MONEY

Write for further information!

THE FRICK-GALLAGHER MFG. CO. WELLSTON OHIO

Pioneers in the development—design—manufacture and installation of sectional rotating steel storage bins and shelving.

MONTHLY SHIPMENTS OF FINISHED STEEL PRODUCTS BY UNITED STATES STEEL CORP.—TONS

Month	1933		1934		1935		1936		1937	
	Ship-ments	Per Cent of Ca-pacity	Ship-ments	Per Cent of Ca-pacity	Ship-ments	Per Cent of Ca-pacity	Ship-ments	Per Cent of Ca-pacity	Ship-ments	Per Cent of Ca-pacity
January	285,137	17.7	331,777	19.8	534,055	31.9	721,414	44.8	1,149,918	*76.7
February	275,929	18.5	385,500	25.9	583,137	39.2	676,315	45.3	1,133,724	*81.9
March	256,793	15.3	588,209	35.2	668,056	41.5	783,552	50.5	1,414,399	*90.9
April	335,321	21.6	643,009	41.5	591,728	36.7	979,907	63.2	.....	.....
May	455,302	27.1	745,063	44.5	598,915	35.8	984,097	63.4	.....	.....
June	603,937	37.4	985,337	61.2	578,108	36.7	886,065	57.1	.....	.....
July	701,322	45.1	369,938	23.9	547,794	34.0	950,851	61.3	.....	.....
August	668,155	39.8	378,023	22.6	624,497	37.3	923,703	59.6	.....	.....
September	576,161	35.6	370,306	23.9	614,933	39.7	961,803	62.0	.....	.....
October	572,897	35.5	343,962	20.6	686,741	41.1	1,007,417	62.6	.....	.....
November	430,358	26.7	366,119	22.7	681,820	42.3	882,643	59.2	.....	.....
December	600,639	38.7	418,630	27.0	661,515	42.7	1,067,365	68.8	.....	.....
Plus or minus year-ly adjustment. (+44,283)	...	...	(-19,907)	...	(-23,750)	...	(-40,859)	...	.....	.....
Total for year	5,805,235	30.1	5,905,966	30.6	7,347,549	38.1	†10,784,273	58.2	.....	.....

* Revised to capacity at Jan. 1, 1937. † Adjusted.

Steel Corporation's Shipments in March Exceeded 1,400,000 Tons

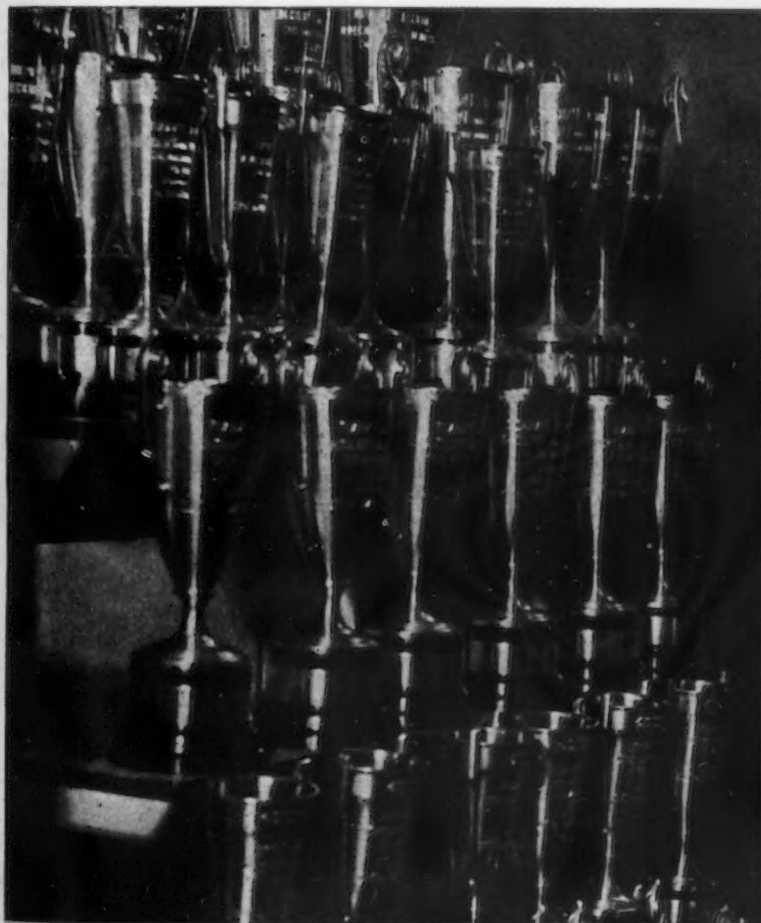
SHIPMENTS of finished steel products by subsidiary companies of the United States Steel Corp. amounted to 1,414,399 tons in March, an increase of 280,675 tons over February and 630,847 tons over March, 1936. The ship-

ments last month were the highest since 1929, and compare with 1,469,394 tons for March of that year.

On the basis of shipments, the corporation's finished steel making facilities operated during the

month at 90.9 per cent of capacity, against 81.9 per cent in the preceding month and 50.5 per cent during March, 1936. The capacity existing at Jan. 1, 1937, however, was smaller than for the preceding year.

Total finished steel shipments of the corporation's subsidiaries in the first three months amounted to 3,698,041, an increase of 70 per cent over the 2,181,281 tons for the first quarter of 1936.



CHAMPIONS for Durability

UNRIVALLED by any other known steel or alloy, Rol-Man Rolled, True (11% to 14%) Manganese Steel holds the championship in every test of Endurance Against Wear under abrasive conditions and Strength Against Breakage under abnormal strains and impacts. Use Rolled Manganese for any vulnerable part and Rol-Man Welding Rod for salvage and protection of any steel part. Send us a sketch or description of your troublesome parts, if you would like a quotation, or write for bulletin "Index of Applications".

True
MANGANESE STEEL
FORGINGS  STAMPINGS
Rolled Products Wire & Rod Products

MANGANESE STEEL FORGE CO., BUTLER & ALLEN STS., PHILADELPHIA, PA.



..PERSONALS..

MALCOLM S. CLARK, heretofore general manager of the Taylor-Winfield Corp., Warren, Ohio, has resigned to become president and general manager of the Federal Machine & Welder Co., Warren. Mr. Clark received his technical schooling at the University of Toronto and after his graduation served as draftsman, special engineer and chief engineer with a number of Canadian companies. In 1922 he went to Detroit and asso-



MALCOLM S. CLARK

ciated himself with the Ford Motor Co. in the engineering department in charge of designing and special machinery. Seven years later he accepted a position with the Taylor-Winfield Corp. as chief engineer and in 1933 was elected general manager and a director of the company.



JAMES A. ROEMER has been elected vice-president, Niles Rolling Mill Co., Niles, Ohio. He has been secretary of the company since its organization March 1, 1935, and retains that position in addition to assuming his new duties as vice-president. R. E. CUNNICK has been appointed assistant general manager of sales of the company. Mr. Roemer was employed for three years in the metallurgical laboratory of the Central Alloy Steel Corp., Canton, Ohio, after graduating from Oberlin College in 1927. He went to the Superior Sheet Steel Co., Canton, in 1930 where he spent two years in the accounting department. In 1932 he joined the Sharon Steel Corp. with which he

did special work in the financial department and in 1934 became director of personnel of the Youngstown Pressed Steel Co., Warren, Ohio, a subsidiary of the Sharon Steel Corp., holding that position until the organization of the Niles Rolling Mill Co. Mr. Cunnick has been associated with sheet steel sales since 1921, when he joined the sales force of the Brier Hill Steel Co., in Youngstown. He has been with the Niles Rolling Mill Co. since its organization.



H. M. FRANCIS has been appointed assistant general manager of sales, and V. H. FARR, assistant general manager of sales for the commercial department of the American Steel & Wire Co. in the reorganization of its general sales organization that started with the recent appointment of JOHN MAY as general manager of sales.

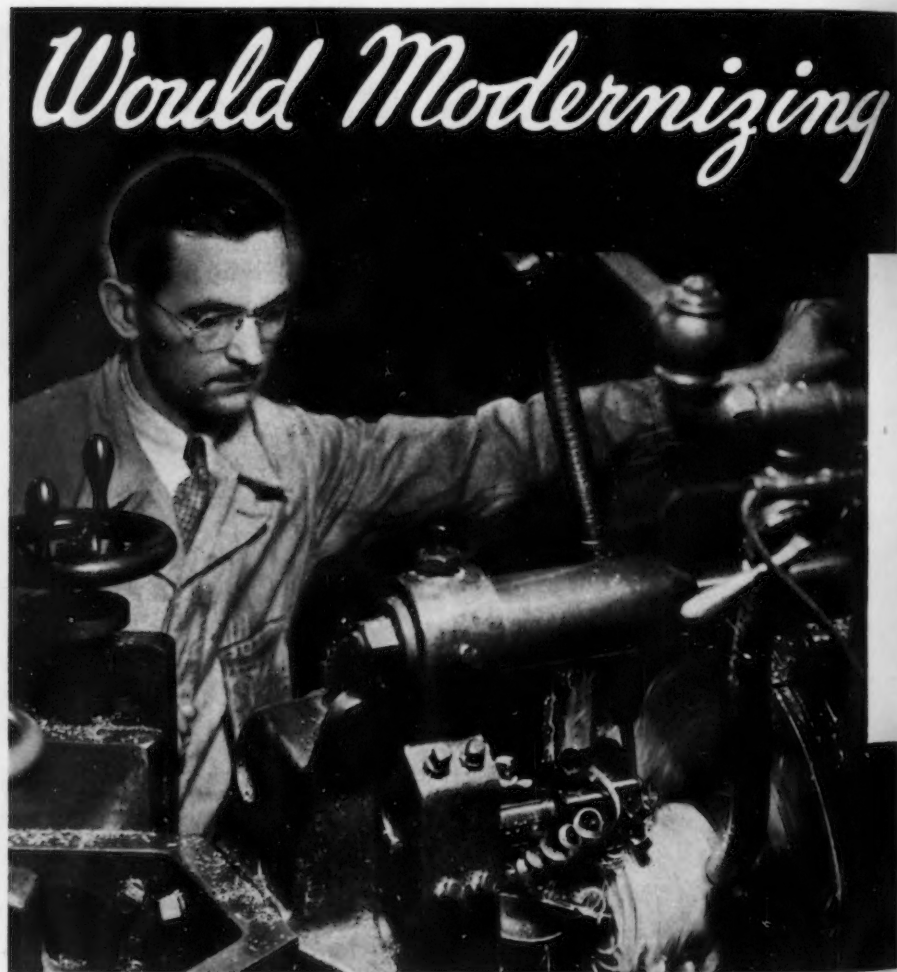
P. T. COONS has been appointed manager, and R. L. RHODES, assistant manager of the electrical, wire rope and construction materials sales. J. W. PATTERSON has been made manager, and E. E. LOUIS, assistant manager of merchant products sales and JOHN GRAHAM, manager and R. F. CURTIS, assis-

tant manager of manufacturers products sales. These officers will be located in the Rockefeller Building in Cleveland, to which the general sales office is being moved from Chicago.

Mr. Francis has been manager of sales in Boston; Mr. Farr has been assistant to C. F. BLACKMER, president of the company in Cleveland, and Mr. Coons has been manager of the construction materials department in New York, Mr. Rhodes has been assistant manager of electrical and wire rope department in New York; Messrs. Patterson and Louis have been assistants to the general manager of sales in Chicago. Mr. Graham has been manager of the cold-rolled strip sales department in New York, and Mr. Curtis has been assistant manager of sales in Philadelphia. H. A. SQUIBBS, FRED CONNEL and W. H. JENNINGS will continue as assistant general managers of sales respectively at Chicago, New York and Baltimore.



GEORGE O. WITH has been appointed manager of sales of the specialty division and concrete bar division of the Carnegie-Illinois



Would Modernizing

Steel Corp. in the Chicago district. After graduating from the University of Illinois in 1915, Mr. With spent three years with the U. S. Navy, following which he was successively city engineer for Joliet, Ill., sales manager of the Expanded Metal Lath Co. and district sales manager of the Concrete Steel Co. He entered the service of the Illinois Steel Co. in 1933 as sales engineer. In his new capacity, in addition to concrete bars, he will handle sheet piling, bearing piles and I-beam-lok and T-tri-lok flooring for the Chicago district.

KENT HARRISON, superintendent of open-hearth, Colorado Fuel & Iron Co., Pueblo, Colo., has resigned.

WILLIAM MONROE WHITE, manager of the hydraulic department of the Allis-Chalmers Mfg. Co., Milwaukee, has returned from a vacation cruise around the world, landing in New York on April 7.

C. E. SULLIVAN, who has been affiliated with the Foxboro Co., Foxboro, Mass., for 26 years, for

the past 17 of which as sales manager, has been appointed vice-president. He is spending the next six weeks in Europe visiting the Foxboro factory in England and distributors in other European countries.

EDWARD L. BOHN, formerly of the North American Refractories Co., has been made sales manager of the fire clay refractories division of Charles Taylor Sons Co., Cincinnati.

P. H. HOLTON has been added to the sales engineering staff of the Philadelphia office of the Carboloy Co., Inc., Detroit.

HARRY ROOKE, who has been connected with the Page-Hersey Tubes, Ltd., Toronto, since 1906, first as secretary-treasurer and later as vice-president and director, has retired.

H. M. HALL, consulting engineer, with office at 108 West Sixth Street, Los Angeles, has been appointed representative for southern California by the Bodine Electric Co., Chicago.

LAWRENCE H. LUND has been elected assistant treasurer of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Lund joined the Westinghouse Electric International Co., Jan. 7, 1931, as auditor and has remained with that organization until his election to office in the Westinghouse Electric & Mfg. Co. He will make his headquarters in Pittsburgh.

RAY W. MORRILL, purchasing agent, Bowman Dairy Co., has been elected president of the Chicago Purchasing Agents Association. G. R. ZEISS, Wahl Co. has been elected first vice-president, and A. V. PLEASANCE, Montgomery Ward & Co., second vice-president. GEORGE SIMONS, Darling & Co., is treasurer and F. J. HEASLIP, Fairbanks, Morse & Co., has been made secretary of the organization.

GEORGE D. HARTLEY, who some months ago disposed of his interest in Sleeper & Hartley, Inc., Worcester, Mass., sailed with Mrs. Hartley from New York, April 13, for an extended European trip.

Your Plant

THROW MEN OUT OF WORK?

Modernizing with Warner & Swasey Turret Lathes often cuts direct factory costs 50%. Results . . .

- 1—User can pay higher wages, and
- 2—still make a profit, and
- 3—keep his prices down. Therefore . . .

He gets the orders that his high-cost competitors lose . . . and with this greater volume he keeps his full crew at work, at higher wages and at profit to himself. And his men are happier because of continuous employment, good pay, and easier work due to improved design of the new machines.

You can have proof of what Warner & Swasey Turret Lathes could do for you and your workmen. Just write . . .

WARNER & SWASEY
Turret Lathes CLEVELAND

Steinle Machine Co. Being Auctioned

ASSETS of the Steinle Machine Co., Madison, Wis., an old established manufacturer of turret lathes and other machine tools, were placed on sale at public auction at the plant, 135 Waubesa Street, Madison, on April 13, the sale to continue until everything is disposed of. Michael Tauber & Co., 411 South Market Street, Chicago, are the auctioneers.

The property to be sold includes an inventory valued at more than \$100,000 in machinery and equipment; tools valued at \$10,000; 200 tons of service parts; 10,000 lb. of bronze spindle bearings and bushings; 12 incomplete Steinle turret lathes machines and ready to be assembled, and all of the right, title and interest of the Steinle Machine Co. in the service parts end of the business.

The Division of Simplified Practice of the National Bureau of Standards has announced that simplified practice recommendation R26-30, steel reinforcing bars, has again been reaffirmed without change by the standing committee of the industry.

...OBITUARY...

HORACE S. WILKINSON, chairman of the board of the Crucible Steel Co. of America, died of heart disease in Chicago on April 11, aged 68 years. He started business life in the real estate business in Syra-

cuse, where he organized the Halcomb Steel Co. and gained control of the Sanderson Steel Co. In 1919 when the Crucible Steel Co. of America was being reorganized, he headed a group of industrialists directing the organization and on Oct. 1, 1919, was made chairman of the board. Shortly thereafter the two Syracuse steel companies controlled by Mr. Wilkinson were merged with Crucible. He was also interested in several shipbuilding and operating companies, including the Great Lakes Steamship Co., of

which he was president, and the Toledo Shipbuilding Co. He was an honorary vice-president of the American Iron and Steel Institute.

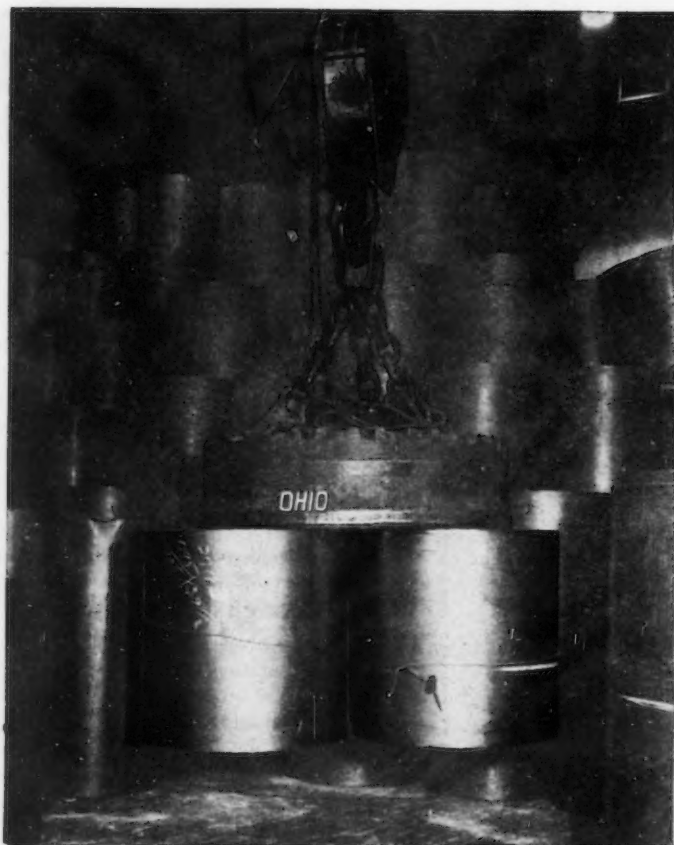
♦ ♦ ♦

WALTER S. DROPPERS, treasurer of the Galland-Henning Mfg. Co., Milwaukee, died on April 7, aged 66 years.

♦ ♦ ♦

FRANK J. FREY, for 53 years an executive of the Geuder, Paeschke & Frey Co., Milwaukee, one of the

OHIO



**The Super or Double Strength 65"
Ohio lifts up to four (4) 9000 lb.
rough coils just off the hot mill
A 36,000 lb. Lift**

**THE OHIO ELECTRIC MFG. CO.
5908 Maurice Avenue, Cleveland, Ohio**

OHIO *Reliable* MAGNETS



HORACE S. WILKINSON

oldest and largest manufacturers of tin, sheet metal and enameled ware in the United States, died on April 4, aged 78 years. He was ill of pneumonia only four days. He was born in Fond du Lac, Wis., and at the age of 14 entered a local machine shop as an apprentice. At 18 he went to Milwaukee and in 1882 joined the old Geuder & Paeschke Mfg. Co., then situated in Chicago, as factory manager. A year later, when the factory was transferred to Milwaukee, Mr. Frey became secretary and treasurer. His name was added to the firm title in 1908. Mr. Frey became president in May, 1935, following the death of Charles A. Paeschke, and in May, 1936, he was elected chairman of the board. His only son, Frank A. Frey, is executive vice-president and treasurer of the company.

♦ ♦ ♦

WILLIAM S. SCHLEMAN, president of the East Dayton Tool & Die Co., died suddenly on April 4 in Punta Gorda, Fla. He was a life-long resident of Dayton, Ohio. He organized the company 15 years ago. He was president also of the Toolcraft Products Co., Evansville, Ind., and the South Bend Tool & Die Co., South Bend, Ind. He was associated with General Motors be-

fore the World War, and during the war was superintendent of airplane construction for the old Dayton Wright Airplane Co.

♦ ♦ ♦

OLIVER C. HUTCHINSON, for many years a leading figure in the automobile industry, died April 6 of a cerebral hemorrhage. Mr. Hutchinson was born in Burlington, Ia., in 1863 and moved to Detroit in 1912, at the invitation of W. C. Durant, to take charge of the old Welch-Detroit plant. Later he became vice-president and general manager of the Olds Motor Works and then became associated with other early automobile leaders in the development of a cycle car. He joined the Hupp Motor Co. in 1915 and was made general sales manager in 1918, retiring several years ago.

♦ ♦ ♦

ARTHUR J. SKEMP, superintendent of the hot mill in the Gary sheet and tin plate plant of the Carnegie-Illinois Steel Corp., died of a heart attack on April 6. He was born in Moxley, England, in 1884. His father brought the family to America when Mr. Skemp was seven years old.

♦ ♦ ♦

WADDEL P. ANDRUS, chairman of the board, High Speed Hammer Co., Rochester, N. Y., died recently of a cerebral hemorrhage, aged 70 years. He purchased an interest in the company 18 years ago and became its sole owner five years later.

♦ ♦ ♦

WALTER LUTTRINGHAUS, president of the Stainless Steel Products Co., La Grange, Ill., died of pneumonia on April 5, aged 73 years.

♦ ♦ ♦

ANTHONY J. WELLY, secretary and treasurer of the Seneca Wire & Mfg. Co., Fostoria, Ohio, died on March 11. He had been identified with the company since 1919.

♦ ♦ ♦

STEPHEN FUGUET, president of the Dallet Co., Philadelphia, died recently in that city, aged 61 years.

♦ ♦ ♦

CARL B. AUDEL, for many years manager of employees' service of the Westinghouse Electric & Mfg. Co., a nationally known leader in industrial relations and industrial safety activities, died in his home at Irwin, Pa., on April 4, aged 67 years.

Mr. Auel was born in Brooklyn in 1870 and attended the Brooklyn Polytechnic Institute, Columbia University School of Mines, and Sibley College at Cornell University from which he was graduated

in 1892 with a degree in mechanical engineering. He joined the Westinghouse Co. in 1893, and after serving in an apprentice course became a member of the works department. He later was in charge of production, then became manager of the railway and control departments, and then assistant manager of the works and directed standardization process of company activities. During this period he was also assistant general manager of the British Westinghouse Co. lo-

cated at the Trafford Park Plant, England. In 1917 he became manager of employees' activities and from that time his career broadened into industrial relations channels. He was a past-president of the National Safety Council and had served as chairman of the elimination of waste committee for the American Society of Mechanical Engineers.

♦ ♦ ♦

HARRY FREDERICK SHAW, assistant general superintendent of the



**GREATER MILEAGE
CRANE WHEELS**

The principal advantages of Standard rolled steel crane wheels are greater strength and toughness and better adhesion to the rail with a minimum of wear on the wheel and rail.

The open hearth steel used in these wheels is produced in our own furnaces subject to close metallurgical control.

STANDARD STEEL WORKS CO.
Subsidiary of the Baldwin Locomotive Works
BURNHAM, PENNA.

PRODUCTS
Steel Castings
Forgings
Rolled Wheels
Heavy Springs
Rolled Rings
Gear Blanks

STANDARD

Clairton works of Carnegie-Illinois Steel Corp., in charge of river transportation, died on April 10, aged 37 years. He had been in charge of the river fleet only a few days more than four months, having taken charge last December when Commodore A. O. Ackard retired. Mr. Shaw at an early age became a deckhand on the river. He sought to improve himself

through extension study in mechanical engineering, and later worked as a machinist for the National Tube Co., Mesta Machine Co., McKeesport Tin Plate Co. and the S. Severance Mfg. Co. before returning to river work. In 1930 he was made general foreman of the marine ways and in 1931 was made a superintendent under Commodore Ackard. Two years later he was

promoted to assistant general superintendent of the department, under "the Commodore."

♦ ♦ ♦

THOMAS DRANSFIELD, since 1927 associated with the Bethlehem Steel Co. as a sales engineer, died at his home in Roslindale, Mass., on April 10. After graduating from the University of Rochester, he went to Cornell and was graduated in 1910. During the World War he was a Government construction engineer at Hog Island. Before becoming associated with the Bethlehem Steel Co. he was connected with Stone & Webster Co. and other engineering concerns.

♦ ♦ ♦

OSCAR A. BERGE, sales representative of the Youngstown Sheet & Tube Co., died on April 6 at his home in Cambridge, Mass. Mr. Berge, a World War veteran, was born in Cambridge, Wis., 40 years ago, and had lived most of his life in Chicago.

Scrap Dealers Form Gulf Coast Chapter

A NEW chapter of the Institute of Scrap Iron and Steel, to be known as the Gulf Coast chapter, was formed at a meeting of scrap dealers from Texas, Louisiana, Mississippi, Alabama and Florida, at the Rice Hotel, Houston, on April 10. The chapter starts with an enrollment of 50 members.

Officers are: President, A. Diefenthal, Southern Scrap Material Co., New Orleans; vice-president, L. A. Zieman, L. A. Zieman & Co., Mobile, Ala.; secretary-treasurer, Richard H. Nathan, Richard H. Nathan & Brother Co., Houston, Tex.

Scrap Buyers Meet To Discuss Exports

THE Independent Steel and Iron Producers Committee on Scrap, which was recently organized to promote the passage of legislation by Congress to place exports of iron and steel scrap on a quota or licensing basis, is holding a series of regional meetings of scrap consumers. Meetings were held last week in Philadelphia and New York. This week they are being held in Pittsburgh, Cleveland and Chicago.

Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa., is chairman of the committee, and Roger L. Wensley, 60 East 42d Street, New York, is secretary.

PERFORATED METAL

INDUSTRIAL and ORNAMENTAL



H & K industrial perforations embrace a range of sizes and shapes intended to meet the most exacting requirements of all industries.

H & K ornamental designs include standard and many beautiful and exclusive patterns suitable for architectural grilles, enclosures, ventilators, and all decorative uses.

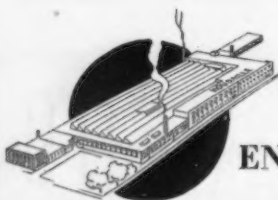
Send us your specifications.

ANY METAL-ANY PERFORATION

The Harrington & King Co.
PERFORATING

5657 FILLMORE ST., CHICAGO - 114 LIBERTY ST., NEW YORK

If it's METAL—



IF it's metal, Houde, in most instances, can produce parts—or even a complete mechanism—for you, and do it more accurately, more speedily and at a lower cost than your own facilities permit. It will cost you nothing to send us a blueprint for estimates—and it may save you considerably.

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ENGINEERING CORPORATION

BUFFALO, N. Y.

A DIVISION OF HOUDAILLE-HERSHEY CORPORATION

Mass Production Held to Be Interstate Commerce; Wagner Act Decision Strengthens Centralized Power

WASHINGTON, April 13.—The iron and steel industry, as well as manufacturing generally, as at present conducted, finds its labor relations definitely within the control of the Federal Government. This was determined by the Supreme Court of the United States yesterday in a series of momentous decisions, of which the case of the Jones & Laughlin Steel Corp. vs. the National Labor Relations Board was outstanding. The decision upholding the National Labor (Wagner) Act was by a divided court, five to four, with Chief Justice Charles E. Hughes reading the majority opinion. Joining the Chief Justice were Justices Louis D. Brandeis, Owen Roberts, Harlan F. Stone and Benjamin N. Cardozo.

The minority opinion was read by Justice James C. McReynolds and was concurred in by Justices Willis VanDevanter, George Sutherland and Pierce Butler.

The majority held in substance that the operations of the Jones & Laughlin Steel Corp. are unquestionably operations within interstate commerce and subject to legislation such as the Wagner Act, now upheld. The minority reviewed previous decision of the court, which have generally refused to allow the Federal Government to interfere with ordinary manufacturing operations in any degree, holding that such operations are essentially local and form no part of the proper scope of the interstate commerce clause of the United States Constitution.

The case arose from a complaint filed with the National Labor Relations Board by the Amalgamated Association of Iron, Steel and Tin Workers over the discharge of 12 of its members employed at the Aliquippa works of the company for alleged union activity. The company declined to submit evidence concerning the facts and elected to stand upon its contention that the act had no proper relation or constitutional warrant as applied to the manufacturing activities of the company.

The Labor Board entered an order directing the reemployment of the discharged employees and the posting of a notice for 30 days of non-interference for joining the union. The board sought enforcement of its order in the manner provided by the act by filing in the Fifth Circuit Court of Appeals in

New Orleans of a petition to require compliance with its order. The Court of Appeals denied the petition, holding that the manufacturing operations of the com-

pany were not subject to regulation by the Federal Government under its commerce power of the Constitution. The board then appealed to the Supreme Court of

MAINTENANCE?

WELL, HARDLY EVER

Hannifin "Packless" Air Control Valves have simplest, disc-type design. There is no packing, and no leakage or packing maintenance troubles. Disc and seat are ground and lapped; simply re-lapping at long intervals restores original efficiency.

Made in 3-way and 4-way types, hand and foot operated, manifold, spring return, electric, and special types. Write for Valve Bulletin 34-A.

HANNIFIN *"Packless"* AIR CONTROL VALVES



HANNIFIN MANUFACTURING COMPANY

621-631 South Kalmar Ave., Chicago, Illinois

ENGINEERS • DESIGNERS
MANUFACTURERS
Pneumatic and Hydraulic
Production Tool Equipment



FEATURING DECIMAL HOUR TIMER with "TAKE OUT TIME" REVERSE CONTROL

Registers from .0001 of an hour to .30 of an hour. This instrument is fast becoming a standard in the timing of steel mill operations and for rate setting and cost finding in the industries. It is the logical Timer where hourly wage rates are in effect.

**MANUFACTURERS, IMPORTERS and DISTRIBUTORS
of all types of
INDUSTRIAL STOP WATCHES, CHRONOGRAPHS and TIMERS**

*Send for our complete catalog.
Confer with us on your special timing problems.*

Our shop with skilled Technicians is at your disposal for quick and economical repairs on all types of Timers and Instruments.

M. J. STILLMAN CO., INC.
116 So. Michigan Avenue, Chicago, Ill.

the United States, which reversed the opinion of the lower court.

J. & L. Engaged in Interstate Commerce

The majority opinion of the Supreme Court held that the diversified operations carried on in many states by the Jones & Laughlin company with "approximately 75 per cent of its products shipped out of Pennsylvania" clearly established that this company is engaged in interstate commerce.

The company challenged the act

in its entirety as an attempt to regulate all industry, thus invading the reserved powers of the states over their local concerns. Upon this point, the court said:

"If this conception of terms intent and consequent inseparability were sound, the act would necessarily fall by reason of the limitation upon the Federal power, which inheres in the constitutional grant, as well as the cause of the explicit reservation of the tenth amendment. The authority of the Federal Government cannot be pushed to

such an extreme as to destroy the distinction, which the commerce clause itself establishes between commerce 'among the several states' and the internal commerce of a state. That distinction between what is national and what is local in the activities of commerce is vital to the maintenance of our Federal system."

The majority opinion pointedly said "that the National Labor Relations act may be construed so as to operate within the sphere of constitutional authority." Furthermore the court observed that "its terms do not impose collective bargaining upon all industry regardless of effects upon interstate or foreign commerce. It purports to reach only what may be deemed a burden or obstruct that commerce and, thus qualified, it must be construed as contemplating the

There is no other Plant—like yours



Products just like yours may be manufactured in other plants—but each manufacturer may be using a different Wyandotte Metal Cleaner.

Why?

There are four principal reasons:

- (a) Differences in Cleaning Equipment;
- (b) Differences in Fabricating Compounds;
- (c) Differences in Time Allowances;
- (d) Differences in the Human Element.

These are also the reasons why we ask permission to "engineer" a job, before recommending the Wyandotte Metal Cleaner best adapted to your particular requirements.



THE J. B. FORD COMPANY
Wyandotte, Michigan

More than 30 years of metal cleaning experience at your service. A Wyandotte Service Representative—and a Wyandotte Supply House—are in your vicinity.

Now That You Have It Will Do With It?

By J. H. W. DEVENTE

BROADENING of the application of the Wagner Labor Relations Act by the Supreme Court rulings to include labor in our principal mass production industries introduces many new problems which must be solved by Government and business.

With such labor defined as "interstate" the Federal Government will hereafter be faced with the primary responsibility of law enforcement in strike situations similar to those which have occurred in the automobile industry. Federal troops can be used to preserve order, when required, and "sit-down" strikers in such industries will hereafter be squatting on Uncle Sam's preserves rather than upon State premises. The Federal alibi for non-enforcement of laws in such cases has gone "out of the window." The "Let Murphy do it" policy must necessarily follow suit. This may prove embarrassing from the political standpoint.

The effect of the rulings upon Mr. John Lewis's strategy may prove equally interesting. All of the agreements made with Lewis by employees in mass production industries, during the CIO drive, have been based upon "proportional representation." If the Wagner Act is enforced, proportional representation also is now "out of the window." It is whole hog or none hereafter. Mr. Lewis will now have to get and prove a 50 per cent plus membership before any employer

exercise of control within constitutional bounds."

Gives Federal Government Control Over Labor

Then follows a statement which apparently is directed at labor demonstrations, including sit-down strikes, as well as industry. For, said the court, "It is a familiar principle that acts which directly burden or obstruct interstate or foreign commerce, or its free flow, are within the reach of Congressional power." Thus the decision, while broad as to Federal control over manufacturing industries, also reaches the long arm of the Federal Government to labor itself. It would seem that labor by this decision, even in the absence of Congressional action, will find itself subject to being haled into Federal courts for violations, such

as sit-down strikes, where heretofore only state action has been threatened by industry, repeatedly the decision cites Federal power to protect interstate commerce "No matter what the source of the dangers which threaten it."

The court regarded the right of employees to organize and select their representatives for lawful purposes as a fundamental right.

Further discussing the application of interstate commerce to the operations of the company, the court in referring to the power of

the Federal Government to regulate such commerce, said:

"Undoubtedly the scope of this power must be considered in the light of our dual system of government and may not be extended so as to embrace effects upon interstate commerce so indirect and remote that to embrace them, in view of our complex society, would effectually obliterate the distinction between what is national and what is local and create a completely centralized government."

(CONTINUED ON PAGE 101)

ou Have What Will You
Do With It?

J. H. DEVENTER

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ment with him.

Under the law, too, plants in which employee representation can show a 51 per cent membership are hereafter definitely closed to union bargaining. Employers in such plants would be breaking the law to discuss wages or working conditions for union minorities with either Mr. Lewis or Mr. Green. Union members in such plants will be wasting their dues, for they can have no representation whatever.

Skilled labor and the A. F. of L. craft unions are given a jolt through the validating of the Wagner Act, which enables a numerical majority to write the rules for every one in a given industry, company, plant or unit. One might cite as a hypothetical case that of a plant employing 51 common laborers and 49 skilled men. The former are affiliated with a CIO union, the latter with the A. F. of L. Under the act, the skilled men will have no voice and the laborers will run the show.

The Administration, Senator Wagner, Mr. Lewis and Mr. Green are reported as hailing these decisions as long sought victories for the cause of labor. It reminds us of the famous advertisement of the baby in the bath tub who cried for the cake of soap. History does not record what the baby did with the soap after he finally got it. The chances are that he ate it, with unpleasant results.

CINCINNATI BICKFORD



SAVES 30%
for
WORTHINGTON

In the drilling and tapping of these centrifugal pump cases, the new High-Speed Super-Service Radial saves approximately 30% in direct labor as compared with previous methods. The Worthington Pump & Machinery Corporation could reasonably predict this saving, for this is their

14th Super-Service Radial at the Harrison, New Jersey, works.

One of their 6' Super-Service Radials is regularly drilling 1-1/64" holes in bronze condenser tube heads at the remarkable penetration rate of 42.9" per minute. This speed is all the more impressive when one considers the rigid manufacturing standards to which Worthington products are held.

The satisfying performance and saving accomplished by the Super-Service Radial in the country's leading plants result from its long lived accuracy and its distinctive convenient control. Every lever is always within easy reach at the operating position.

May we send complete details?



The
CINCINNATI
BICKFORD
TOOL CO.

OAKLEY - CINCINNATI
OHIO, U. S. A.

SUPER-SERVICE RADIALS

Imports (In Gross Tons)	February		Two Months Ended February	
	1937	1936	1937	1936
Pig iron	11,340	14,660	23,774	29,693
Sponge iron	1,117	463	1,396	771
Ferromanganese ¹	1,550	908	3,920	3,156
Spiegeleisen	1,230	1,425	1,890	3,465
Ferrochrome ²	16	1	69	1
Ferrosilicon ³	119	41	233	137
Other ferroalloys ⁴	50	.....	52	.....
Scrap	2,471	7,562	4,892	15,276
<i>Pig iron, ferroalloys and scrap</i>	<i>17,893</i>	<i>25,060</i>	<i>36,226</i>	<i>52,499</i>
Steel ingots, blooms, etc.	1	.....	110	.....
Billets, whether solid or hollow	185	55	236	123
Wire rods	974	2,192	2,600	4,166
<i>Semi-finished steel</i>	<i>1,160</i>	<i>2,247</i>	<i>2,946</i>	<i>4,289</i>
Concrete reinforcement bars	98	107	870	238
Hollow steel bars	199	130	363	335
Merchant steel bars	3,480	2,525	8,584	5,580
Iron slabs .....	.....	.....	.....	.....
Iron bars	128	164	265	311
Boiler and other plate	8	2	28	52
Sheets, skelp and saw plate	945	1,660	2,441	3,756
Die blocks or blanks, etc.	11	1	13	5
Tin plate	2	10	43	14
Structural shapes	6,762	3,112	14,681	7,791
Sheet piling	512	20	513	527
Rails and track material	1,477	255	1,657	517
Welded pipe	137	323	386	685
Other pipe	1,568	783	2,043	2,879
Cotton ties	349	.....	349	.....
Other hoops and bands	2,407	1,278	4,548	3,177
Barbed wire	920	1,885	2,505	4,122
Round iron and steel wire	453	425	778	872
Telegraph and telephone wire .....	.....	1	6	1
Flat wire and steel strips	225	234	507	466
Wire rope and strand	197	173	424	358
Other wire	279	164	557	273
Nails, tacks and staples	1,704	2,611	2,875	4,788
Bolts, nuts and rivets	91	70	115	88
Horse and mule shoes	22	28	46	42
<i>Rolled and finished steel</i>	<i>21,974</i>	<i>15,961</i>	<i>44,597</i>	<i>36,877</i>
Malleable iron pipe fittings	34	.....	63	4
Cast iron pipe and fittings	227	.....	404	.....
Castings and forgings	340	90	455	178
Total	41,628	43,358	84,691	93,847

¹ Manganese Content. ² Chrome Content. ³ Silicon Content. ⁴ Alloy Content.

Scrap Exports Increase Sharply

(CONTINUED FROM PAGE 57)

were 13,218 tons against 13,356 tons in January.

Imports Slightly Lower

Imports of iron and steel products, exclusive of scrap, were 39,157 gross tons, valued at \$1,-671,272, in February, compared with 40,642 tons, valued at \$1,716,-324 in January and 35,796 tons, valued at \$1,447,897 in February of last year.

Pig iron was the principal item of importation in February, amounting to 11,340 tons. The chief sources of pig iron were British India, Soviet Russia and the Netherlands.

Aggregate imports in the two-month period of 1937, excluding scrap, were 79,799 tons, valued at \$3,387,598 compared with 78,571 tons, valued at \$3,240,517 in the corresponding period of 1936.

Steel Employment at New Peak of 556,000

THE number of employees in the steel industry rose to a new high of 556,000 during February, according to the American Iron and Steel Institute. The figures for February show that the steel companies had 98,000 more employees on their payrolls than were employed in 1929.

The February level of employment was 23 per cent above the total of 453,000 employed a year ago, while total payrolls of the industry in February, amounting to \$74,278,000, were nearly half again as large as the February 1936 payrolls of \$50,250,000.

In January of this year the industry employed 548,000 and paid out \$76,423,000 in payrolls. February payrolls were below the January level because of the short month.

Average earnings of the 503,000 wage-earning employees on the industry's payrolls in February were likewise well above a year ago. Hourly earnings of wage earners in February average 72.8c. per hr., while average weekly wages amounted to nearly \$31 as wage earners worked an average of 42.5 hr. per week during the month. Hourly earnings in January averaged 72.5c., and wage earners worked an average of 40.5 hr. per week.

MARSCHKE

HEAVY DUTY GRINDERS AND BUFFERS

THIS illustration shows a NARROW TYPE MARSCHKE GRINDER STAND with 3 H.P. motor. Other sizes of this same type of Marschke Grinder are available with 1 to 5 H.P. motor sizes.

This is a popular machine for general utility, as well as tool grinding, but there are a dozen other types of Marschke Grinders—all sizes—for wheels from 10" to 30" diameter and motor sizes ranging from 1 to 25 H.P.

The Marschke line also includes Buffers and there is a type as well as size of Marschke Grinder or Buffer best suited for your particular requirements.

A catalog showing the full line of Marschke Grinders and Buffers, will be sent promptly upon receipt of request.

VONNEGUT MOULDER CORP.

1807 Madison Ave. Indianapolis, Ind.



REINFORCING STEEL

**... Awards of 5020 tons
—7625 tons in new
projects.**

AWARDS

Brooklyn, 105 tons, public school No. 253,
to Bethlehem Steel Co.

Brooklyn, 200 tons, Schaefer Brewing Co.
stockhouse, to Bethlehem Steel Co.

Brooklyn, 110 tons, addition for Wilson
Co., to Igoo Brothers.

New York, 300 tons, Vesey Street Federal
office building, to Igoo Brothers.

New York, 600 tons, West side elevated
highway, 153rd to 160th Streets, to Truscon
Steel Co.

West Point, N. Y., 170 tons, cadet arm-
ory, Bethlehem Steel Co.; reported incor-
rectly last week to Carroll-McCreary Co.

Yonkers, N. Y., 360 tons, building for
Habitshaw Cable & Wire Corp., to Truscon
Steel Co.

Newark, N. J., 175 tons, Pennsylvania
Railroad improvement, to Igoo Brothers.

Pittsburgh, 250 tons, Union Supply Co.
warehouse, to Lind Co.

River Rouge, Mich., 860 tons, Ford tire
plant, to Truscon Steel Co.

Chicago, 1400 tons, Kraft-Phoenix Cheese
Co., to an unnamed bidder.

Oakland, Cal., 500 tons, substructure for
San Francisco-Oakland Bay Bridge, to Colo-
rado Fuel & Iron Co.

Oakland, 160 tons, superstructure for San
Francisco-Oakland Bay Bridge, to Con-
crete Engineering Co.

NEW REINFORCING BAR PROJECTS

New York, 2385 tons, Flushing River
bridge; bids taken April 14.

New York, 300 tons, bridges at World's
Fair grounds; bids April 16.

New York, 109 tons, Willets Avenue
underpass; bids taken April 13.

New York, 129 tons, St. Anne's Avenue
bridge; bids taken April 13.

Warsaw, N. Y., 225 tons, Warsaw-Perry
Center highway.

Chicago, 150 tons, United States Tobacco
Co.

Chicago, 400 tons, addition to Jane
Addams housing project.

Chicago, 300 tons, overhead crossing at
103rd Street.

Chicago, 130 tons, Central Steel & Wire
Co.

Cap au Gris, Mo., 650 tons, dam across
Mississippi River.

Emeryville, Cal., 205 tons, building for
Bigelow-Sanford Carpet Co.; bids opened.

Los Angeles, 500 tons, grade separation;
bids soon.

San Diego County, Cal., 137 tons, girder
crossing; bids opened.

Yakima, Wash., 1572 tons, Roza reclama-
tion project; bids opened.

Odair, Wash., 260 tons, Columbia Basin
Reclamation project; bids opened.

Holtville, Cal., 160 tons, All-American
project; bids opened.

Chemical Analyses Book by A.S.T.M.

FOR the first time the American Society for Testing Materials has issued a publication giving under one cover all of its methods of chemical analyses of the ferrous and non-ferrous metals. These include four methods for analyzing ferrous metals, 12 for non-ferrous metals and alloys, and three methods of quantitative spectrochemical analysis of non-ferrous metals. In-

cluded in the volume are the greatly amplified and modernized methods of chemical analysis of steel, cast iron, open-hearth iron and wrought iron. These new combined methods were developed to provide methods for the determination of important elements in plain and alloy steels and irons, and the new methods comprise an up-to-date treatise on this subject.

Copies of this publication can be obtained from society's headquarters at 260 South Broad Street, Philadelphia, for \$2.50 in cloth binding.

Close Current Control— Better Plating Results

With the

UDYLITE RHEOSTAT



Self-Cleaning, Cam-Type Switch

The Self-Cleaning, Cam-Type Switch is the heart of the Udylite Rheostat. It operates easily—positively—efficiently under all service conditions. Perfect contact with bus bars is ensured because switch leaves are ground when in closed position. Extra current carrying capacity is provided through ample contact surface and cross-sectional area. The leaves of the self-cleaning cam-type switch are actually multiple cleaning units. The switch in closing causes the leaves to exert a wiping action on the surface of the bus, insuring positive contact at all times and at all points.



Current variations are frequently the cause of poor plating results. And poor plating results cost money!

The Udylite Rheostat smooths out current "peaks and valleys" by providing you with close control over the current entering the plating bath. It further enables you to step up production by reducing plating time through maintenance of maximum permissible current in the tank.

An instrument of precision, the Udylite Rheostat is built to stand the knocks of continuous service in the plating room. Cam-type, self-cleaning switches govern resistors made of helically coiled, nichrome wire. Coil brackets have large radiating surface insuring cool resistor contacts. Instruments—ammeter and voltmeter—are of highest quality obtainable. All metal parts are Udylited for efficient protection.

Udylite Rheostats are furnished for all electroplating processes in standard sizes from 15 to 5000 ampere rating with voltage drops from 1 to 5. Higher voltage drop rheostats are made to special order.

THE UDYLITE COMPANY

1651 E. Grand Blvd., Detroit, Mich.

New York
30 E. 42nd Street

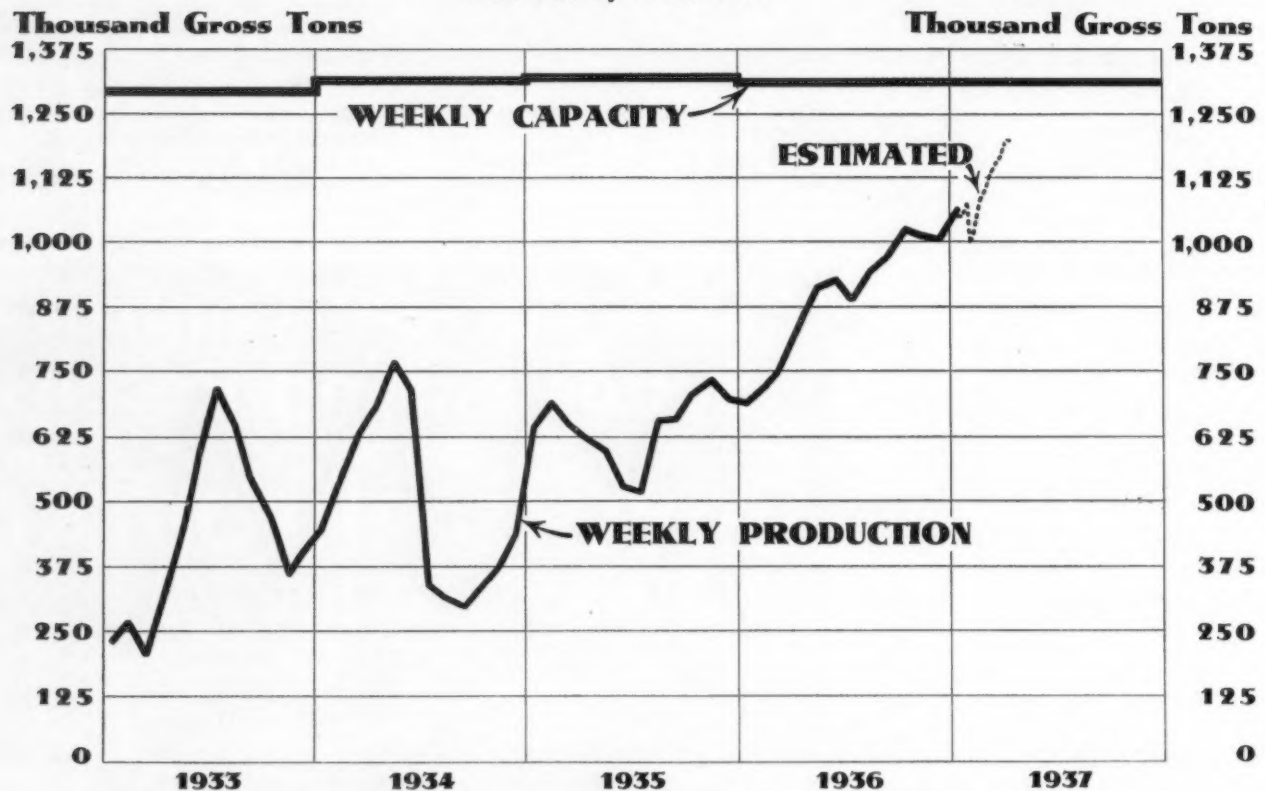
Chicago
1943 Walnut Street

Cleveland
3756 Carnegie Ave.

San Francisco
114 Sansome Street

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week
Pittsburgh	94.0	94.0
Chicago	84.0	84.5
Valleys	89.0	88.0
Philadelphia	67.5	67.0
Cleveland	75.0	75.0
Buffalo	92.0	90.0
Wheeling	99.0	99.0
Southern	75.0	77.5
Ohio River	86.0	90.0
Western	92.0	91.5
St. Louis	87.0	88.0
Detroit	100.0	100.0
Eastern	98.0	93.0
Aggregate	91.0	91.0

Weekly Booking of Construction Steel

FROM THE IRON AGE

	April 13, 1937	April 6, 1937	Week Ended Mar. 16, 1937	April 14, 1936	Year to Date 1937	1936
Fabricated structural steel awards.....	42,300	36,650	17,900	10,575	402,545	313,190
Fabricated plate awards.....	0	2,755	2,940	600	51,030	97,965
Steel sheet piling awards.....	0	0	0	200	14,930	15,405
Reinforcing bar awards.....	5,020	7,265	3,045	3,500	54,340	126,755
Total Lettings of Construction Steel	47,320	46,670	23,885	14,875	522,845	553,315

...SUMMARY OF THE WEEK...

... New business declines but production is undiminished.

o o o

... Coke prices are higher; scrap weakens in all centers.

o o o

... 1937 ore movement begins on Lakes as dock stocks fall to lowest in years.

NEW steel business has declined moderately in the past week, which was to be expected in view of the heavy tonnages ordered in March, together with the fact that mills have very little, if any, steel to sell for second-quarter shipment and that consumers are generally well covered for this period. Incoming business, however, is still fairly good on the basis of comparisons with February, but is considerably below the volume of late March, which, of course, was extraordinary.

Steel production shows no let-down from an estimated 91 per cent of capacity. Slight declines in some districts are offset by increases elsewhere. Pig iron output is being increased by the blowing in of two blast furnaces by the United States Steel Corp., one at Gary and one at Lorain. The only idle merchant furnace in the Chicago district, now being relined, will soon go into blast as pig iron demand in that territory increases, possibly as a protection against a further advance in prices which may be brought about by higher coke and ore costs. Connellsville furnace coke has gone up 35c. a ton and foundry coke 25c., while by-product coke is higher in nearly all districts.

While this raw material is advancing in price, steel scrap, which has had a phenomenal advance, shows pronounced weakness in nearly all centers. The declines of a week ago brought out a large volume of scrap that presumably was being held for higher prices, with the result that both brokers and consumers have reduced their offering quotations or have withdrawn from the market. Opening of navigation on the Great Lakes has also released scrap for early water shipment. Steel scrap has dropped \$1 at Chicago and 50c. at Pittsburgh, but the Philadelphia market, supported by export demand, is unchanged. Advancing ocean freight rates, which have gone as high as \$11 for shipment to Japan, and scarcity of bottoms may temporarily check foreign sales. THE IRON AGE scrap composite has declined to \$21.42, the first downward revision since November.

WHETHER the decline in prices of non-ferrous metals and iron and steel scrap has had an effect upon sentiment among steel buyers is not readily discernible, but there is undoubtedly an easing of pressure on the mills, particularly in the matter of getting third-quarter orders on the books. A considerable volume of such business has been taken at prices to be named later, and, as a consequence, some buyers are anxious for an early announcement of third-quarter quotations. It seems likely, however, that price decisions will be deferred until mills have a clearer idea of second-quarter profit margins, the picture being complicated by the fact that the recent price advances have not as yet been realized on a substantial volume of shipments.

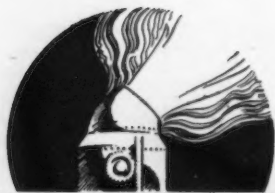
Heavy shipments by the mills are now making it possible for some consumers and jobbers to build up inventories, but, on the other hand, the automobile industry, which does not stock steel except in the form of manufactured parts, is exerting constant pressure for shipments. This is particularly true of Chrysler and Hudson, which have resumed production after prolonged strike shutdowns.

RAILROAD equipment business is featured by orders placed by the Southern Railway for 5600 cars. A Chinese railroad is inquiring for 75 locomotives, a Mexican inquiry is for 18. The St. Louis-San Francisco is building 16 locomotives in its own shops and the Santa Fe will buy 11 diesel-electric engines.

Structural steel lettings have spurted to 42,000 tons, the largest for any week since last July. Express highway viaducts for the New York Central in New York take 12,600 tons, a Chevrolet automobile plant at Buffalo, 5000 tons, and a new open-hearth plant for Inland Steel Co. at Indiana Harbor, Ind., 5000 tons. Both the Inland and Acme steel companies plan considerable expansion in the Chicago area.

The 1937 ore movement on the Great Lakes opened on Monday with the departure of two cargoes from Escanaba, Mich. A Chicago steel plant, in urgent need of certain grades of ore, has obtained an emergency all-rail rate. Stocks of ore at Lake Erie docks, amounting to 2,851,951 tons, are the lowest in many years.

Steel companies have made no official statements regarding the Supreme Court decision on the Wagner Labor Act, but independent companies, which are now conferring with the Steel Workers' Organizing Committee, are studying it closely, in view of the fact that this union is reported to have enrolled less than a majority of workers in several of the leading plants.



...PITTSBURGH...

... Volume of new business declines, but almost equals current shipments.

o o o

... Production is unchanged in Pittsburgh and Wheeling districts.

o o o

... Coke prices are advanced; steel scrap declines 50c. a ton.

PITTSBURGH, April 13.—During the past week producers have made little headway in working off backlogs. The total volume of sales on finished steel products, with the exception of plates and shapes, so far this month is off considerably compared with the same period in March, but new business has been almost equal to shipments. Heavy plate and shape specifications are running ahead of those placed at the same time last month.

An important factor in the present situation is the increasing tendency of many producers to turn down tonnages on items such as sheets, strip and wire. These moves are of course directed toward elimination of speculative sales. The phenomenal demand for sheets has slowed up some during the past week, but the amount of incoming business is still in excess of shipments. There are signs, however, that the remainder of this month will not be as brisk as the activity of March and the first few days of April. This is expected in view of the heavy bookings placed within the past six weeks. Mills will no doubt welcome such a let-down in view of pig iron and raw steel shortages.

Meanwhile, steel ingot production in the Pittsburgh district is unchanged at 94 per cent, while the Wheeling district also holds steady at 99 per cent. Railroad buying was featured this week by the purchase of 5600 cars by the Southern Railway.

The largest structural awards involve substantial tonnages for the New York Central express highway in New York.

Tin plate operations continue at 100 per cent, and there is little chance that this rate will change for several months.

As a result of increased costs following the coal wage agreement, beehive furnace coke at Connellsville has been advanced 35c. a ton, while foundry beehive has been advanced an additional 25c. a ton.

The scrap market is slightly softer, with No. 1 heavy melting steel off 50c. a ton.

Pig Iron

Consumption of iron is exceedingly good. Non-integrated steel plants are taking all they can get, which in many cases is not as much as they require. Jobbing foundry business is showing further improvement, with orders from this source larger than a year ago. Producers have been so busy on current shipments that little stock has been laid up. Furthermore, total demand is ahead of production, with many producers taking care of old customers only. Even in these cases orders have been pared down to a fraction of the original inquiry. Steel-making iron especially is scarce.

Semi-Finished Steel

Fresh orders so far in April total about three-fourths of the tonnage booked in the same period last month. Part of this let-down is due to mills refusing some tonnages owing to their own heavy requirements. While some consumers have fairly large stocks, the majority are hard pressed for steel and even some integrated mills could do with more than they are making. Meanwhile, produc-

tion and shipment continue at a rate held in check only by lack of steel.

Bolts, Nuts and Rivets

Producers are working down backlogs, and production is at virtual capacity. New business continues light and this trend is expected to last for the next few weeks at least, in view of the heavy commitments made last month. Orders from car builders are a little more plentiful. A considerable volume of specifications from this source is expected in view of recent car lettings. Meanwhile, the bulk of fresh orders is coming from miscellaneous sources. Resumption of automobile buying on a larger scale will add to delivery problems.

Bars

Specifications are running about 30 per cent under the corresponding period in March, but are substantially in excess of the volume placed early in February. The rate of incoming business is much better than producers had looked for. Extended deliveries are exerting their influence in that many customers are placing orders today for fear they will not obtain the material in time to maintain their own production schedules. The tightness in raw steel and the miscellaneous character of orders now on the books prevent any appreciable dent being made in backlogs.

Cold-Finished Bars

Specifications dropped off some during the past week. Orders within the past few days, however, have shown a tendency to move upward. Two or three weeks ago jobbing interests were heavy buyers, whereas at present the majority of new business is coming from miscellaneous sources such as washing machine, sewing machine, and business machine manufacturers. New buying on the part of automobile companies has been light, owing to commitments made before the price advance went into effect. It is expected that automobile makers will be into the market in a much larger way within the next month. Delivery promises are no better than a week ago.

Reinforcing Bars

Awards during the past week have been fair, but new inquiries are rather meager. There has, however, been a considerable number of small jobs (averaging less than 50 tons) placed during the last few weeks. Truscon Steel Co. is furnishing 860 tons of concrete bars for Ford's River Rouge tire plant. The same company was also awarded the contract for 605

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous:
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Apr. 13, 1937	Apr. 6, 1937	Mar. 16, 1937	Apr. 14, 1936
Rails, heavy, at mill.....	\$42.50	\$42.50	\$42.50	\$36.37½
Light rails, Pittsburgh.....	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh..	37.00	37.00	37.00	28.00
Sheet bars, Pittsburgh.....	37.00	37.00	37.00	28.00
Slabs, Pittsburgh	37.00	37.00	37.00	28.00
Forging billets, Pittsburgh...	43.00	43.00	43.00	35.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.45	2.45	2.45	1.85
Bars, Chicago	2.50	2.50	2.50	1.90
Bars, Cleveland	2.50	2.50	2.50	1.90
Bars, New York.....	2.78	2.78	2.78	2.20
Plates, Pittsburgh	2.25	2.25	2.25	1.80
Plates, Chicago	2.30	2.30	2.30	1.85
Plates, New York.....	2.53	2.53	2.53	2.09
Structural shapes, Pittsburgh	2.25	2.25	2.25	1.80
Structural shapes, Chicago...	2.30	2.30	2.30	1.85
Structural shapes, New York.	2.5025	2.5025	2.5025	2.06¼
Cold-finished bars, Pittsburgh	2.90	2.90	2.90	2.10
Hot-rolled strips, Pittsburgh.	2.40	2.40	2.40	1.85
Cold-rolled strips, Pittsburgh	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	3.15	3.15	3.15	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	3.25	3.25	3.25	2.50
Sheets, galv., No. 24, P'gh...	3.80	3.80	3.80	3.10
Sheets, galv., No. 24, Gary...	3.90	3.90	3.90	3.20
Hot-rolled sheets, No. 10, Pittsburgh	2.40	2.40	2.40	1.85
Hot-rolled sheets, No. 10, Gary	2.50	2.50	2.50	1.95
Cold-rolled sheets, No. 20, Pittsburgh	3.55	3.55	3.55	2.95
Cold-rolled sheets, No. 20, Gary	3.65	3.65	3.65	3.05
Wire nails, Pittsburgh.....	2.75	2.75	2.75	2.10
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.15
Plain wire, Pittsburgh.....	2.90	2.90	2.90	2.40
Plain wire, Chicago dist. mill.	2.95	2.95	2.95	2.45
Barbed wire, galv., P'gh....	3.40	3.40	3.40	2.60
Barbed wire, galv., Chicago dist. mill	3.45	3.45	3.45	2.65
Tin plate, 100-lb. box, P'gh..	\$5.35	\$5.35	\$4.85	\$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Apr. 13, 1937	Apr. 6, 1937	Mar. 16, 1937	Apr. 14, 1936
No. 2 fdy., Philadelphia.....	\$25.76	\$25.76	\$25.76	\$21.3132
No. 2, Valley furnace.....	24.00	24.00	24.00	19.50
No. 2, Southern Cin'ti.....	23.69	23.69	23.69	20.2007
No. 2, Birmingham.....	20.38	20.38	20.38	15.50
No. 2, foundry, Chicago*....	24.00	24.00	24.00	19.50
Basic, del'd eastern Pa.....	25.26	25.26	25.26	20.8132
Basic, Valley furnace.....	23.50	23.50	23.50	19.00
Malleable, Chicago*	24.00	24.00	24.00	19.50
Malleable, Valley	24.00	24.00	24.00	19.50
L. S. charcoal, Chicago.....	30.04	30.04	30.04	25.2528
Ferromanganese, seab'd, car- lots	95.00	95.00	95.00	75.00

† This quotation is subject to a deduction of 38c. a ton for phosphorus content of 70 per cent or higher.

* The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh....	\$22.75	\$23.25	\$23.25	\$15.75
Heavy melting steel, Phila...	20.75	20.75	19.75	13.75
Heavy melting steel, Ch'go..	20.75	21.75	20.75	14.37½
Carwheels, Chicago	21.75	21.25	19.50	14.00
Carwheels, Philadelphia	21.75	21.75	18.50	14.75
No. 1 cast, Pittsburgh.....	20.25	20.25	19.25	15.25
No. 1 cast, Philadelphia.....	22.75	22.75	19.75	14.25
No. 1 cast, Ch'go (net ton)..	17.75	17.00	17.00	12.50
No. 1 RR. wrot., Phila.....	20.50	20.50	18.75	13.25
No. 1 RR. wrot., Ch'go (net)..	18.50	19.00	18.50	13.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$4.60	\$4.25	\$4.25	\$3.65
Foundry coke, prompt.....	5.00	4.75	4.50	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	15.50	16.00	16.25	9.50
Lake copper, New York.....	15.62½	16.12½	16.37½	9.62½
Tin (Straits), New Lork....	60.62½	61.87½	65.25	47.12½
Zinc, East St. Louis.....	7.00	7.50	7.50	4.90
Zinc, New York.....	7.35	7.85	7.85	5.27½
Lead, St. Louis.....	5.85	6.75	7.35	4.45
Lead, New York.....	6.00	6.90	7.50	4.60
Antimony (Asiatic), N. Y....	17.00	17.00	17.00	13.50

The Iron Age Composite Prices

Finished Steel

April 13, 1937	2.605c. a Lb.
One week ago	2.605c.
One month ago	2.605c.
One year ago	2.097c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	HIGH	Low
1937.....	2.605c., Mar. 9;	2.330c., Mar. 2
1936.....	2.330c., Dec. 28;	2.084c., Mar. 10
1935.....	2.130c., Oct. 1;	2.124c., Jan. 8
1934.....	2.199c., April 24;	2.008c., Jan. 2
1933.....	2.015c., Oct. 3;	1.867c., April 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

\$23.25 a Gross Ton
23.25
23.25
18.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	HIGH	Low
\$23.25, Mar. 9;	\$20.25, Feb. 16	
19.73, Nov. 24;	18.73, Aug. 11	
18.84, Nov. 5;	17.83, May 14	
17.90, May 1;	16.90, Jan. 27	
16.90, Dec. 5;	13.56, Jan. 3	
14.81, Jan. 5;	13.56, Dec. 6	
15.90, Jan. 6;	14.79, Dec. 15	
18.21, Jan. 7;	15.90, Dec. 16	
18.71, May 14;	18.21, Dec. 17	
18.59, Nov. 27;	17.04, July 24	
19.71, Jan. 4;	17.54, Nov. 1	

Steel Scrap

\$21.42 a Gross Ton
21.92
21.25
14.63

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	Low
\$21.92, Mar. 30;	\$17.92, Jan. 4	
17.75, Dec. 21;	12.67, June 9	
13.42, Dec. 10;	10.33, April 23	
13.00, Mar. 13;	9.50, Sept. 25	
12.25, Aug. 8;	6.75, Jan. 3	
8.50, Jan. 12;	6.43, July 5	
11.33, Jan. 6;	8.50, Dec. 29	
15.00, Feb. 18;	11.25, Dec. 9	
17.58, Jan. 29;	14.08, Dec. 3	
16.50, Dec. 31;	13.08, July 2	
15.25, Jan. 11;	13.08, Nov. 22	

tons for that part of the express highway in New York running from 153rd to 160th Streets. Producers are being pushed for better deliveries and promises have become further extended. Shortage of steel plays no little part in this situation.

Plates and Shapes

Backlogs on heavy plates and shapes continue to mount sharply and total specifications so far this month are easily 25 per cent ahead of the comparable March period. Plates especially are in good demand, with deliveries becoming further extended. Private jobs continue to outrun public works projects. The largest single award in the past week involves material for New York Central Railroad express highway viaduct in New York. American Bridge Co. will fabricate 3900 tons for that section between W. 153rd and W. 160th Streets, while Bethlehem Steel Corp. was awarded 8700 tons for work between W. 135th and W. 146th Streets. Jones & Laughlin Steel Corp. will fabricate 2450 tons of plates and shapes for a Ford Motor installation-transfer building at Dearborn, Mich. In addition to the large jobs which are coming out, a considerable amount of tonnage is going into miscellaneous projects involving less than 100 tons.

Sheets

Sheet bookings so far this month are about 20 per cent less than for the same period last month, but are substantially ahead of the tonnage booked in the early part of February. The falling off in new business can be ascribed in part to producers' actions in checking the mad rush to get on order books by turning down considerable tonnage. Meanwhile, backlogs on most items are unchanged. Incoming business, however, is still ahead of shipments. With many inquiries being turned down, there is little chance of the present situation showing a material change for some time. Miscellaneous sources continue to specify freely and a fair amount of business is coming from areas now recovering from flood damages. Railroad car builders are still pressing for material and additional lettings will swell the already topheavy backlogs.

Strip

The total volume of business booked during the past week was slightly ahead of the previous period. The diversification, however, was less marked and a definite trend in demand will probably be obtainable within the next few

weeks. The market is spotty in that some customers adequately covered their requirements before the price increase, while other consumers are finding it necessary to order additional material owing to a revision of their production schedules. Buying by automobile parts makers is rather light owing to the heavy banks built up some time ago. When automobile assemblies get away to a good start, it is expected that these supplies will be rapidly used up.

Tubular Products

Production is at an exceptionally high rate and promises on miscellaneous line pipe sizes run from four to six weeks. New oil-country specifications are only slightly lower than a month ago since the buying practices of most oil companies preclude heavy forward buying. After producers get rid of orders now on the books quite an extended period of production will be necessary in order to replenish their own and jobbers' stocks. Standard pipe has been moving rapidly, owing to the numerous home and factory building projects. Specifications for both stationary and locomotive boiler tubes continue in good volume.

Wire Products

Consumption of merchant wire items is fairly steady, but specifications reaching the mills are comparatively light owing to heavy commitments placed before price advances went into effect. As soon as present backlogs are worked down it is assumed that mills will be more liberal in their acceptance of new business. Meanwhile, demand for wire rods and manufacturers' wire continues to be greater than the amount producers are willing to place on their books. Every effort is being made to eliminate speculative buying and to date the attempts to keep the situation from getting beyond control have been very successful. Export inquiry continues to reflect a substantial premium above domestic quotations.

Tin Plate

With specifications against contracts exceptionally heavy, there is little chance of present capacity operations showing little change for several months. Fluctuations which do occur will be because of production problems rather than lack of orders. Tin plate consumption is considerably ahead of last year in many lines. Sales of beer plate are heavier and the almost universal use of cans for oil has brought about a consistent demand for this item. Renovation plans in

areas recently flooded are resulting in a volume of business for paint manufacturers considerably ahead of the like period in 1936 and this improvement is being reflected in general line can specifications.

Railroad Buying

Railroad awards this week were featured by the Southern Railway order for 5600 cars. The award was distributed as follows: 2000 box cars and 250 low-side gondolas to Pullman Standard Car Mfg. Co., 500 box and 500 auto box cars to Mt. Vernon Car Co., 1100 hopper cars to Pressed Steel Car Co., and 1250 high-side gondolas to American Car & Foundry Co. This is the largest single award since the avalanche of orders placed early in the year.

Coal and Coke

Beehive furnace coke prices for spot demand have been advanced 35c., making the range on Connellsville furnace coke prompt \$4.60 to \$4.75 a ton. Beehive foundry coke has been advanced an additional 25c., making the lower range in that grade \$5 a ton f.o.b. Connellsville. These increases are the result of added costs following the recent coal wage agreement. Beehive coke furnace contracts which contain a wage clause will be revised upward some time this week, and it is expected that the advance will approximate 35c. Meanwhile, the coke situation remains exceedingly tight because ovens were shut down for four or five days while the coal agreement was being negotiated. However, production is rapidly getting back to normal and deliveries this week will resume the same level as before the interruptions. Practically all the available supplies are being applied to contract orders. Coal production has fallen off sharply since many customers piled up stocks in anticipation of a prolonged shut down.

Method and results of an "Investigation of Relative Stresses in Solid Spur Gears by the Photoelastic Method," by Paul H. Black, are given in Engineering Experiment Station Bulletin No. 288, 32 pages, published by the University of Illinois, Urbana, Ill. Objects of the investigation were: (1) To determine stress concentration factors for spur gear teeth of Brown & Sharpe form; (2) to determine the best location of the keyway with respect to the teeth in a solid gear; and (3) to determine the maximum bore which should be used in a given solid gear. The price is 40 cents.

Senator Walsh Threatens Boycott For Violators of Labor Act

WASHINGTON, April 13.—Boycotting of firms from Government business if they do not comply with the National Labor Relations Act has been proposed by Senator Walsh, Democrat, of Massachusetts, following a conference with Representative Healey, also a Democrat, of Massachusetts, who with the Senator sponsored the Walsh-Healey Government Contracts Act. The Senator also said he will offer an amendment to the Walsh-Healey law which will make all contracts over \$2500 subject to the act. At present it applies only to contracts over \$10,000.

To make the act still more rigid, Senator Walsh also has proposed that dealers or jobbers bidding on Government contracts be required to get certificates from firms supplying materials showing that they have complied with labor provisions of the act. The act provides for an 8-hr. day, 40-hr. week with payment of time and one-half for overtime.

The amendment to the Walsh-Healey act which would bar Government business from firms not complying with the Wagner Labor Act would authorize the Controller General to prohibit bidding on Government contracts for three years after violation of the Labor Act. The purpose is to compel employers to recognize an outside union and to grant it the right of collective bargaining without interference.

Senator Walsh said the proposal to reduce the exemption to all contracts over \$2500 is to prevent bidders from "splitting up the bids in order to avoid the Labor Department's supervision."

Penalties for misrepresentation would be provided under the amendment requiring certificates showing that materials for Government contracts were produced in accordance with labor provisions of the Walsh-Healey Act.

The amendments to tighten the Walsh-Healey Act long have been sought by Secretary of Labor Frances Perkins. In her quarrel with steel manufacturers over supplying the Navy with steel under the terms of the Walsh-Healey Act instead of yielding to requests to relax its provisions, she urged that they be strengthened. She was widely criticised at the time in Congress for her adamant stands. One of her severest critics was Senator

Walsh. He threatened to offer an amendment to the act entirely exempting from its terms all purchases made for the national defense.

Galvanizers Meeting Set For April 26

CURRENT practice in sheet galvanizing will come in for broad discussion at the three-day session of the Galvanizers Commit-

tee to be held at the Hotel Statler, St. Louis, Mo., beginning April 26.

Among the technical subjects scheduled for discussion are the following: "Development in Galvanizing Wire and Sheets," by U. C. Tainton; "Metalizing or Spraying Zinc," by William C. Reid; "Use of Pure Zinc in Hot Galvanizing," by J. J. Enlow; "Fluxes," by L. T. Baldwin; "Tube Galvanizing," by P. C. Ely; "Rolls for Galvanizing," by J. A. Succop; and "Inhibitors," by Walter G. Trench.

Deere & Co., Rock Island, Ill., manufacturers of farm implements, have purchased the factory of the former Velie Motors Corp., Moline, Ill.

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Because of its modern design, the LANDMACO Threading Machine produces to modern standards for accuracy, production, and operating costs.

The speed range and operating efficiency of the LANDMACO make it profitable to discard the slower, obsolete methods of threading.

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WAYNESBORO, PA.

THE IRON AGE, April 15, 1937—93



CHICAGO

... *Sales of steel decline but are still in good volume.*

• • •

... *Opinion now leans to the view that production is outrunning consumption.*

• • •

... *Inland Steel and Acme Steel are inaugurating expansion programs.*

CHICAGO, April 13.—Sales have dropped back, but they are still in good volume, considering that some mills are booked tight in all commodities for the remainder of the second quarter. The exact attitude of buyers cannot as yet be gaged, but there is a feeling among steel producers that in some important lines production is running ahead of consumption and that a minor recession in general business activity may take place in the summer months. However, from early fall on all expressed opinions point to an excellent business period.

Ingot output has dropped one-half point to 84 per cent of capacity, this being due to mill operating conditions and not to slackening of the rate of specifications. A more orderly handling of mill schedules is bringing slight improvement in deliveries on a few products, notably in wire and wire products.

The leading producer has lighted another blast furnace at Gary, bringing the active count to eight at South works and 10 at Gary, and lighting of the only idle merchant stack awaits completion of a relining job.

Steel mill expansion goes forward without check, Acme Steel Co. being about to let construction contracts and Inland Steel Co. announcing an award of 5000 tons of structural material to house five new open hearths which will then give this company a total of 36 furnaces.

Railroad purchases remain high and include 5600 freight cars placed by the Southern.

Distress tonnages are adding to the woes of the scrap market, in

which prices are still giving ground. This flurry seems to be wholly contained within the scrap market and therefore bears no relation to the general business picture.

Pig Iron

There is still a fair amount of new buying and releases are running ahead of the March rate. Prices remain stable and appear not to be affected by what is going on in the scrap market. The movement of coke indicates that the melt of pig iron is below the rate of shipments and thereby shows that users are attempting to accumulate stocks, which are appraised by sellers as only a fraction of what buyers carried in years such as 1927 and 1928. Many foundries are handicapped by lack of skilled labor, with the result that there is much farming out of work, not only from manufacturing to jobbing foundries, but also from one jobber to another.

Wire Products

New buying remains consistent as to diversity of products and is in good volume. Specifications are extremely heavy. This being the time when the usual large spring movement is rapidly moving to its peak. The crop outlook is exceptionally good and farmers are spending their money accordingly. Producers expect the current upswing in country demand to extend through April and May. In a few products the delivery situation is improved because mills now have had time to rearrange schedules and are on a better working basis than during the early weeks of the heavy rush. Prices are steady. Sellers do not believe that present levels will in any way harm the

business picture. They are now concerned in watching the course of profits, which may be the basis for third quarter quotations. Manufacturing lines are active and the general industrial picture is excellent as viewed from the angle of the use of wire products.

Sheets

Users are still willing to buy for third quarter deliveries at prices which will prevail after July 1. All classes of consumers are taking all that is allotted to them from mill schedules which are filled to the end of the quarter. No clamor is heard from users who ordered much more tonnage than they are getting, which is a natural condition and which shows that much buying was overbuying to assure adequate shipments.

Bars

New buying continues at a fast pace and some Chicago bar mills are now completely scheduled for the remainder of the quarter, while others can still add some tonnage. Heavy machinery builders are unusually busy and have heavy order books. Production of farm equipment is at capacity and it is moving steadily from manufacturing plants. Strike disturbances at tractor plants have been settled and this industry is again using its full quota of steel mill products.

Structural Material

The Cap au Gris, Mo. Dam, requiring 5000 tons, is still in suspension while Washington and local officials settle on wage scales to be paid. Inland Steel Co. has awarded 5000 tons for a new open-hearth plant which will house five furnaces, and bids have been taken on the 1000-ton addition for Acme Steel Co. In all other phases the market is quiet, road work being limited to a few beam spans. And railroad lettings to minor bridge and turntable repairs.

Rails

Shipments of rails remain at practical capacity, which is set by the equipment for special treatment. Most railroads are now busy on spring track work and already a considerable part of last fall's purchases have been put in track. The light rail market is quiet.

Plates

New buying is of less importance than in recent weeks, but backlogs are large and mills are well engaged. Car builders are at capacity as limited by the labor supply and their ability to get steel. They can retain high output through the summer months with very little new business coming to them in the meantime. The week's

railroad business turns strongly to locomotives, which includes an inquiry by the Santa Fe for 11 diesel-electric units.

Cast Iron Pipe

Shipments are slow into the Chicago area, and inquiries do not point to improvement. Minneapolis has ordered 600 tons, but it stands alone in the matter of large purchases. A noticeable change in the market is the switch by oil refiners from cast iron pipe to high-pressure steel pipe. Outlook for spring and summer is confined very closely to the limits of Government spending through such agencies as WPA.

Reinforcing Bars

Fabricators are busy, but most of their attention is centered on the large number of jobs on which they gave protection prior to the price advance. Many such contracts read "to be under way by June 1" and, therefore, it is readily seen that most of the attractive tonnage now under consideration is already covered and only the formality of letting general contracts need be undertaken. Large apartment construction is in the very early planning stage, but rents are rapidly advancing and multi-story flat awards are a possibility in the near future. An addition to a Chicago housing project will take 400 tons. Shops are counting on more highway and bridge work from Illinois and surrounding States.

Dust Control Men Elect Officers

MANUFACTURERS of dust control equipment held a meeting in Cleveland recently and elected the following officers:

President, H. B. Loxterman, Blaw-Knox Co., Pittsburgh; vice-president, M. A. Eiben, Northern Blower Co., Cleveland; executive secretary-treasurer, Arthur J. Tuscan, Cleveland.

An engineering committee was appointed, one of whose principal duties will be the development of standards of dust control practice. The need for such recognized practices is said to have existed for some time. The engineering committee will also be available for consultation by other associations or groups interested in the preparation of codes and development of regulations.

The offices of the association are at 1213 West Third Street, Cleveland.



... Heavy demand for coke though price is higher.

... Sheet buyers ordering for third quarter.

CINCINNATI, April 13.—The district coke market is exceptionally active. Despite a price increase of 75c. a ton on by-product grade last week, users are steadily ordering and shipments are heavy. In fact, oven interests report difficulty in accommodating all demands. Current reports indicate coke in movement is for immedi-



... Bids being taken on a number of projects.

SAN FRANCISCO, April 12.—Bids were opened on 1572 tons of reinforcing bars called for in a reclamation project at Yakima, Wash. Bids will be opened soon on 500 tons of bars required for a grade separation structure at Los Angeles.

Bids on two sizable water supply systems will be opened in the near future. Salem, Ore., will take bids until April 15 on 1000 tons of 4 to 16-in cast iron pipe involved in the Salem River pipe line and in the 12th Street arterial main, while at Eureka, Cal., the Mad River water supply project will get under way within a few weeks with bids on approximately 60,000 ft. of from 18 to 24-in. line and concrete coated steel pipe.

Minneapolis-Moline Power Implement Co. took 625 tons of structural steel in two projects to lead an aggregate of 1143 tons of shapes for the week. Colorado Fuel & Iron Co. was awarded 500 tons of bars for the substructure and railroad yard for the San Francisco-Oakland Bay Bridge. Total reinforcing lettings were 918 tons.

The rush of orders made in an attempt to beat price advances has disappeared, with activity return-

ing to normal. It is the opinion of some authorities that construction work will fall off considerably as a result of advances. Backlogs, however, have been built up to such an extent that mills can operate from three to six months on present orders.

Sheet steel users were still active in the market the past week. Ordering extends well into the third quarter at the then prevailing prices. Analysis of customer's use of sheet steel is reported to reveal that material is being fabricated as received and any stocking is of finished products primarily. The leading district interest is taking business only from regular sources and is holding to quotas based on previous orders. Demand for hot-rolled annealed sheets is exceptionally heavy, and mills are finding the delivery problem difficult to solve.

Open-hearth operations are off a few points to about 87 per cent of capacity. One interest has taken out one furnace to provide a margin of safety in the event of difficulty. Twenty-nine out of 34 open hearths are now operating.

ing to normal. It is the opinion of some authorities that construction work will fall off considerably as a result of advances. Backlogs, however, have been built up to such an extent that mills can operate from three to six months on present orders.

Lake Superior Passage Opens 10 Days Early

TEN days ahead of the average date, Lake navigation was opened Sunday night by two freighters carrying coal to the Algoma Steel plant at Sault Ste Marie, Ont. The vessels, *Algocen* and *Algosteel*, followed the ice-breaking carferry *Chief Wawatam* and two Sault tugs which also served as ice breakers. Along with this opening of the Soo locks and the St. Mary's River, the Straits of Mackinac saw passage of the season's first fleet. Seventeen large vessels were en route from Toledo to Lake Michigan ports. This is the earliest fleet movement in many years.

Shippers have been particularly anxious to clear steamship lanes this year in anticipation of the biggest volume of Lake shipping since 1929. At Escanaba, Mich., ore dock pockets are filled and 2200 carloads in the yards await loading on ships, four of which already are in the harbor. Five Pittsburgh Steamship Co. ships were reported Sunday morning passing Detroit, up-bound for Detour, Mich., which awaited arrival of the first coal cargoes of the season.



... PHILADELPHIA ...

... April orders are running behind those of same period of March.

o o o

... Consumption is not lessening, however.

o o o

... Operations increase to 67½ per cent of capacity.

PHILADELPHIA, April 13.—The most noticeable difference in market conditions this week from those reported in last week's issue is a more marked decrease in the volume of orders being booked. Nearly all sellers report such a reduction and some say bookings the first 12 days of this month are 50 per cent less than in the same period of March.

Varying explanations have been offered for this decrease in business. The most common is that many consumers bought more than was required for current needs, on account of talk of higher prices and doubt as to their ability to secure steel when needed because of extended deliveries. Another reason put forth is that specifications received in the last week of March because of the deadline for identified projects were unusually numerous, so that the normal volume coming in now seems small in comparison. Some believe that it is consumption that is lessening, but this opinion is not commonly held, and a superficial survey of the district would seem to indicate that as much potential demand exists as ever.

Deliveries are not improved and the reduction in backlogs in the past week is so slight as to be negligible. Buyers are unrelenting in their constant efforts to improve their positions as regards deliveries and a great many of the orders being placed today for delivery at mills' convenience and at price at time of shipment are for protection against the possibility that current congested conditions will hold throughout the summer.

Jobbers in the district report a rapid turnover of stocks. A common opinion is that warehouses are capitalizing heavily on the inability of mills to satisfy customers on deliveries, but representatives of warehouses maintain that very little of their currently excellent

business is from that source, but is mostly caused by their regular trade specifying more frequently and in greater quantities.

Ingot output increased a half point to 67½ per cent of capacity.

Pig Iron

Shipments are still heavy, but there may be a tendency downward in the next few weeks. Open talk of another pig iron increase has been stilled, but there seems to be some undercover sentiment in favor of such a move. The tightness that prevails in pig iron supplies also holds true of ore and coke. Avail-



... GREAT BRITAIN ...

... Pig iron output governed by raw materials.

o o o

... Exports of steel checked by shortage of supply.

LONDON, April 13 (By Cable)—Production of pig iron is governed by the ore, coke and scrap shortage. Ore exports from Bilbao are suspended owing to the intensification of hostilities, and the United Kingdom arrivals are affected. The new Seaton Carew coke oven battery, South Durham Steel & Iron Co., starting this week will lead to the relighting of two reconditioned blast furnaces. New business in pig iron is practically suspended as the output of the current quarter is sold out, and price uncertainty is restraining forward business.

Better deliveries of Continental

able and future supplies of all three are practically all spoken for already, and with the exception of a very few orders for spot shipment, it is likely that consumers who are not covered will go hungry.

Plates and Sheets

Plates are requiring up to 12 weeks for delivery and sheets are holding at 23 to 24 weeks. There are no signs of easing in either product. Local mills are generally not quoting on much for shipment before the end of this quarter.

Structural Shapes

The largest award in several weeks went to American Bridge Co., and is for a bridge in Juniata County, Pa., requiring 1300 tons. Other awards this week, all of which were small, included work at Delaire, N. J.; Tamaqua and Chester, Pa. Fabricators concerned are the Bethlehem Steel Co., Belmont Iron Works, and the Bethlehem Contracting Co.

Imports

The following iron and steel imports were received here during the past week: 1300 tons of pig iron from British India; 20 tons of steel forgings, 23 tons of steel tubes, 9 tons of steel billets, 19 tons of wire rods and 44 tons of steel bars from Sweden; 12 tons of steel bars, 144 tons of structural shapes, and 14 tons of steel bands from Belgium.

semi-finished steel is expected shortly. Output of finished steel is at maximum, yet deliveries are still behindhand, and the heavy demands of the shipbuilding, construction and engineering trades are causing a curtailment of exports.

About 12,500 apprentices are striking on Clydeside for higher wages, and a one-day general strike at Clyde ship and engineering yards is threatened for Friday.

The meeting of the International Tin Plate Cartel raised the official minimum export prices by 2s. 9d. basis to the c.i.f. rates equal to 22s. 6d. basis, international cartel, f.o.b., which is still below prices paid recently. Inquiry is brisk, but business is limited by the uncertainty of steel supplies.

Demand for Continental iron and steel is unrelaxed at premiums varying between 30s. and 50s. paper which the United States is now also paying.

The International Steel Cartel and the Hoop Cartel have abolished fines on quota excesses. Members of the International Tube agreement agreed to moderate price increases. There are no other price changes.



... Foundry melt checked
by scarcity of molders.

• • •

... Construction contracts
show large gain.

BOSTON, April 13.—There has been no material change in the pig iron situation. Furnaces are inclined to sit tight on offers, yet the weekly turnover continues to run around 1000 tons despite the fact that melters in many cases are fairly well covered. The New England melt apparently has increased as much as it can until more molders are available. Foundries are well supplied with orders and indications are they can maintain current working schedules for several months. The Mystic Iron Works furnace probably will be blown in around May 1, if present plans carry through.

By-product foundry coke prices have been advanced 50c. a ton by New England producers where the \$3.10 freight rate applies.

Gasoline pump manufacturing is being stepped up, and production of oil burners, heating units and radiators is increasing rather rapidly due to current building and prospects. In Massachusetts alone, March construction permits were 62 per cent greater than in February, this year, and 19 per cent larger than in March, 1936. New residential building made the greatest gain.



Kittery, Me., is in the market for 188 tons of 6-in. pipe.

Brookline, Mass., has awarded 200 tons of 8 and 10 in. to Donaldson Iron Co.

St. Louis County Water Co., 6600 Delmar Street, University City, Mo., plans about 54,000 ft. for water system extensions in Oakville district.

Racine, Wis., plans about 8600 ft. for extensions in water system. Fund of about \$50,000 is being arranged through Federal aid for this and other improvements in water service. James W. Beaupre is city engineer.

Dewey, Okla., plans pipe lines for water system and other waterworks installation. Bond issue of \$36,000 has been authorized.

National Cast Iron Pipe Co., Birmingham, has tendered low bid of \$171,730.70 for water system in Clay County, near North Kansas City, Mo., for Clay County Public Water District No. 1, National Bank Building, North Kansas City, Walter Duncan, manager. Entire project will cost close to \$400,000. Henrici-Lowry Engineering Co., West Tenth Street Building, Kansas City, Mo., is consulting engineer.

Waterbury, Conn., plans pipe lines for water system in several streets. Bond issue of \$150,000 has been authorized.

Amite City, La., plans about 3,000 ft. of 6-in. for extensions in water system and for replacements in number of existing lines. Fund of about \$50,000 is being arranged for work. E. G. Freiler, Hammond, La., is consulting engineer.

Helena, Mont., is arranging Federal grant and loan of \$378,250 for pipe lines for water system, including new trunk line from water source on Beaver Creek to city reservoir, about 14 miles, and for line from latter point to junction with city mains, about 8.2 miles. Oscar Baarson is city engineer.

Sewerage and Water Board, New Orleans, closes bids April 27 for cast iron pipe, including specials, for water system, in connection with new auxiliary pumping station on Panola Street.

Metropolitan Utilities District, Omaha, Neb., plans pipe lines for extensions in water system in several districts. Cost close to \$50,000. T. A. Leisen is engineer for district.

Mosinee, Wis., plans pipe lines for extensions in water system. Fund of \$22,295 has been secured through Federal aid. Work is scheduled to begin soon.

Belmont, Mass., plans pipe lines for extensions in water system in several streets. Cost about \$32,000.

Dallas, Tex., plans pipe lines for extensions and replacements in water system in Highland Park district. Cost about \$200,000, including other waterworks improvements in that area. Myers, Noyes & Forrest, Tower Petroleum Building, are consulting engineers.

Minneapolis has awarded 600 tons to an unnamed bidder.

Yakima, Wash., has awarded 100 tons to Pacific States Cast Iron Pipe Co.

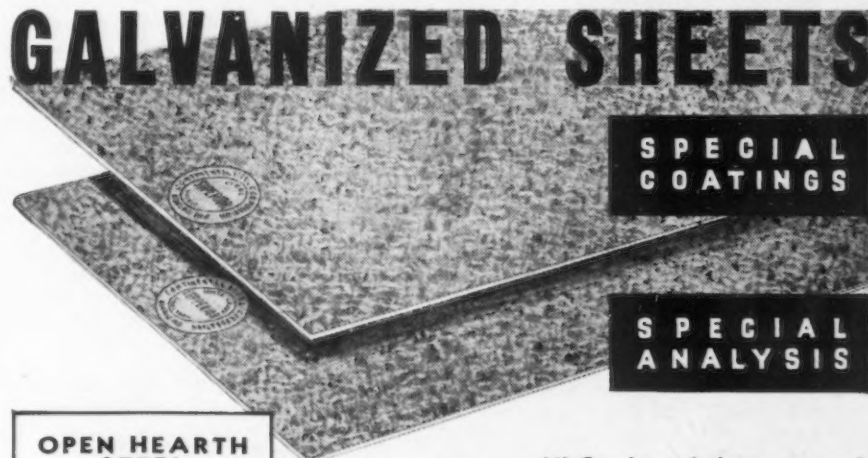
Salem, Ore., will open bids April 15 on 1000 tons of 4 to 16-in. for Santiam River pipe line and 12th Street arterial main.

Manhattan Beach, Cal., will open bids April 15 on 100 tons for a water supply line.

South Gate, Cal., will open bids April 19 on 182 tons of 4 and 6-in.

Grass Valley, Cal., has opened bids on 118 tons for a water supply system.

Bids for the construction of a new steel, Diesel-engine propelled, lighthouse tender for service on the Missouri River, are to be opened in Washington on May 10, according to H. D. King, Commissioner of Lighthouses, Department of Commerce.



OPEN HEARTH STEEL

Wire: Bright Basic, Annealed, "Konik, Special Manufacturers, Galvanized, "Flame-Sealed.

Wire Rods, Nails, Staples, Bale Ties, Barbed Wire, Fence—15 Types; Gates and Fittings.

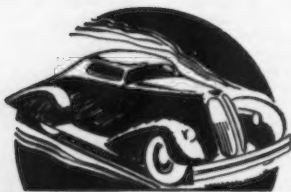
Sheets: Black Galvanized, Special Coated, Roofing and Siding—14 Styles.

*Trade Mark Reg. U. S. Pat. Off.

All Continental sheets are made from basic open hearth steel—copper-bearing, special analysis, etc. Their workability and other physical properties are fully developed by rolling and tempering to suit their purpose, whether for specialized manufacture or general shop use. Beside regular galvanizing by the SUPERIOR PROCESS, in standard and special heavy weights, Continental offers "Tite" and "Extra-Tite" and other special coatings. Inquiries invited regarding special sheets for specific applications.

CONTINENTAL STEEL CORP. General Offices: Kokomo, Indiana
Plants at Kokomo, Indianapolis, Canton





... CLEVELAND ...

... Slowing down in new steel business becomes more pronounced.

... Heavy backlogs sustain production at an undiminished rate.

... Lake Superior ore movement starts; scrap market shows further weakness.

CLEVELAND, April 13.—The slowing down in the demand for finished steel, which was slightly in evidence a week ago, has become more pronounced, but the drop is not uniform with the various producers. Business with some mills has declined as much as 50 per cent, others report a falling off of 25 to 30 per cent, and some of the local sales offices state that the decline in their orders is scarcely noticeable.

With the heavy backlogs in finished steel, the slowing down in business has not caused any reduction in ingot output. Steel plant operations are unchanged this week at 75 per cent of capacity in the Cleveland-Lorain district and advanced one point to 89 per cent in the Youngstown district.

National Tube Co. has started up a blast furnace in Lorain, now operating all five stacks.

No appreciable reduction in mill backlogs because of the decline in orders is as yet in evidence. With mills well filled for the quarter on nearly all products and considerable business on their books for the third quarter, the slowing down is causing little concern. About the only product on which good deliveries can now be secured is pipe, which some mills can ship within two to four weeks.

Stainless steel is in much heavier demand than ever before and makers are 10 to 12 weeks behind on shipments. Such consumers as fabricators in the building field, who are intermittent buyers, are said to be substituting other materials because of delayed deliveries of stainless steel.

The scrap market continues to show weakness, and steel-making grades have again declined 50c. a ton.

Water shipments of Lake Superior

ore started Monday with the despatch of two cargoes from Escanaba. It will be several days before boats can start from the head of the Lakes. Several boats are now on the way up the Lakes for cargoes, but are having difficulties because of ice conditions. As a number of steel plants are badly in need of ore, they are anxious to have cargoes as soon as possible. Its urgent need for certain grades of ore led a Chicago district consumer to secure an emergency freight rate for shipping ore by rail to Lake Michigan ports. While a rate was established for shipment to the Chicago district only, a report has gained circulation that steel companies have applied for all rail rates on ore as a protection against a possible tie-up if a strike occurs on Great Lakes boats. There is no talk of labor troubles on these boats and none is expected this season.

Pig Iron

Sales took quite a spurt the past week, a good volume of orders being taken, some of which were for sizable lots. There has been some talk of an advance in prices, which evidently has proved a market stimulus. Automobile foundries and agricultural implement manufacturers were among the purchasers. The new business indicates that many foundries did not buy enough iron in the first quarter to last them through the current quarter. Shipments are somewhat lighter this month than in March, when nearly all foundries issued specifications for all the iron due on their first quarter contracts. Foreign inquiry is still plentiful. A sale of bessemer iron by an interior furnace for export is reported at \$25.50, or \$1 a ton above the market.

Sheets

A moderate slowing down in new business is reported by most mills, but this has not yet resulted in any improvement in deliveries and consumers are still pressing for shipments. Orders that are being booked are for the third quarter subject to prices prevailing at the time of shipment, buyers being anxious to get on the rolling schedules of the mills. Some are trying to find producers that can take on additional tonnage for late second quarter shipment. Some mills, while taking care of their regular customers, are not anxious to load up with third quarter business. No new buying by automobile companies is reported, as these are under cover for the current quarter. Considerable tonnage suspended during the first quarter has been released by the Chrysler and Hudson automobile plants following the resumption of these plants, and heavy shipments are being made to General Motors plants.

Strip Steel

With consumers in the motor car field well covered for the second quarter, new demand has declined and one mill reports a slight improvement in deliveries. Specifications continue heavy. Mills are being crowded for shipments and some have on their books all the tonnage they can produce during the current quarter. However, some are promising deliveries of hot strip in eight weeks.

Bars, Plates and Shapes

The volume of miscellaneous business in bars is holding close to recent levels and no gain is reported in deliveries, which range from four to eight weeks. Alloy steel bars are very active. Reinforcing bars are moving well in small quantities, but there is no call for sizable lots. While plate orders have dropped slightly, mills with a large amount of railroad business on their books have heavy backlogs and are 10 to 12 weeks behind on deliveries. With little inquiry and no sizable awards, the lull in the construction field continues. However, mills are getting good specifications for projects placed before the price advance and have order books filled for six to eight weeks' operations.

Iron Ore

Shipments from Lake Erie ports in March amounted to 636,551 tons or 463,603 tons more than in the same month last year. The balance of ore on docks on April 1 was 2,851,951 tons, the lowest on this date for many years. The dock balance April 1 last year was 4,734,146 tons.



....BUFFALO....

... Pig iron buying light; users well covered.

o o o

... Steel production remains at high level.

BUFFALO, April 13.—Buffalo district users of pig iron are fairly well covered for the second quarter, with little or no inquiry appearing. Most of the buying was done shortly after March 1, and there has been a lull since that time.

Open-hearth operation remains the same as last week, with Bethlehem operating 28 out of 30, and a possibility of one more furnace being put on; Republic seven out of nine and Wickwire-Spencer Steel Co. two out of four.

The Eastern States Milling Co.'s addition in the town of Tonawanda is being figured by engineers. There will be about 200 tons of structural steel in the job.



....ST. LOUIS....

... Dam on Mississippi to take large tonnage.

o o o

... Pig iron melt heavy, but sales are light.

ST. LOUIS, April 13.—Plans have been submitted to bidders for Dam No. 25 on the Mississippi River at Cap au Gris, Mo., requiring 4000 tons of structural steel, 600 tons of reinforcing bars, 219,430 sq. ft. of steel sheet piling, 1518 track ft. 80-lb. rail and 392 track ft. 60.5-lb. rails and fastenings, and 310 tons of steel castings. Bids are due about May 4.

Buying of sheets and plates continues at a high rate, with deliveries becoming more and more extended. There has been some let-up in the demand for structural steel. Movement of wire products from warehouse to dealer to consumer is reported to be heavy, but orders to the mills are light.

Sales of pig iron are light, consisting of a carload or two occasionally, as melters generally have

made commitments for requirements through the second quarter. The melt is being maintained at the high rate that has prevailed for some time.

Ingot operations were stepped up this week to 90 per cent of capacity.



RAILROAD BUYING

Alton & Southern is inquiring for one or two locomotives of 2-8-2 type.

St. Louis-San Francisco is building 16 locomotives in its shops at Springfield, Mo.

Atchison, Topeka & Santa Fe will purchase 11 diesel-electric locomotives.

Youngstown & Northern has ordered one 0-6-0 type switching type locomotive from Lima Locomotive Works.

Minneapolis, St. Paul & Sault Ste. Marie has ordered four locomotives of 4-8-4 type from Lima Locomotive Works.

Lake Superior & Ishpeming has ordered 100 ore cars from Bethlehem Steel Co., in addition to 200 also ordered from this company not previously reported.

Royal State Railways of Siam will take bids until July 30 at office of superintendent of stores, Royal State Railways, Bangkok, Siam, for the following equipment: 100 all-steel covered goods wagons (box cars), 75 all-steel low-side wagons (gondola cars), 20 brake vans (caboose cars), three bogie oil tanks wagons (tank cars). Poon Sakuntanago is stores superintendent. Blank tender forms may be obtained from Messrs. Sandberg, 25 Broadway, New York, at a cost of \$25.

A Chinese railroad is inquiring for 75 locomotives, on which American builders are expected to quote.

Southern Railway has ordered 5600 freight cars as follows: 1250 gondolas to American Car & Foundry Co.; 2000 box cars and 250 gondolas to Pullman-Standard Car Mfg. Co.; 500 automobile cars and 500 box cars to Mount Vernon Car Co.; and 1100 hopper cars to Pressed Steel Car Co.

Lineas Ferreas de Mexico is inquiring for 18 locomotives.



..BIRMINGHAM..

... Gulf States Improvements expected to go ahead.

o o o

... Production and shipments of steel unabated.

BIRMINGHAM, April 13.—With approval of the sale of the Gulf States Steel Co. to the Republic Steel Corp., it is expected that plans will proceed for further developments at the Gadsden, Ala., works. These have lately been held up by the pending consolidation.

At that time Gulf States Steel set aside more than \$2,000,000 for plant additions.

T. M. Girdler, president of Republic Steel, is expected in Birmingham the latter part of this week or the early part of next week. It is thought that he may make an announcement at that time.

Production and shipments of iron and steel continue undiminished. Buyers continue to press the mills for deliveries. In the face of the heavy business already placed, there is a fair amount of new business flowing in. Mills are doing their best to take care of the immediate needs of customers, both as to specifications and to new tonnage.

Last week open-hearth operations ranged from 17 to 18 units. This week 17 are scheduled, a reduction of one. Blast furnaces are unchanged, with 16 in operation.



... Labor troubles create some uncertainty.

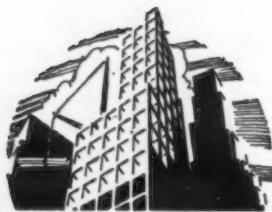
o o o

... Plant operations hold to a high level.

TORONTO, April 13.—Labor troubles at the Oshawa plant of General Motors Corp. are causing uncertainty in the Canadian iron and steel markets. It is said that other plants associated with the steel industry may be affected, but so far strikes have been confined to a couple of companies, and the Ontario Government is taking measures to nip the labor problems in the bud. Some 3500 men are out at Oshawa. Plant operations, other than by those companies affected by strikes, are being maintained at high levels and orders are steadily piling up. New business from the automotive industry has slowed down, but otherwise sales and deliveries are being sustained both for domestic consumption and for export.

Pig iron sales are steady. Production has increased to meet the higher demand. Imports are increasing from the United States, but no iron is coming in from Britain. Prices are firm and unchanged.

Scrap dealers say they can sell all the material they can pick up. Prices are firm and unchanged.



...NEW YORK...

... *New steel business has declined this month.*

o o o

... *Falling off to be expected after heavy buying of past several months.*

o o o

... *No official intimation as yet regarding third quarter steel prices.*

NEW YORK, April 13.—New steel business has declined during the past week, which is not surprising in view of the steady buying in large volume over the past three or four months. By the end of March nearly all buyers had covered for all the steel that mills could ship during the second quarter, and, likewise, the mills had sold (with some few exceptions) everything that they could roll and ship during this quarter. Therefore, buying incentive is now lacking. The lull comes as a welcome relief to sales offices, which have been deluged with business, not all of which they were able to take because of the sold-up condition of the mills.

The decline in buying has no special significance at the moment, so far as can be discerned. Mills that have taken business for third quarter at prices in effect at time of shipment have done so reluctantly and upon the insistence of customers. Most of them would have preferred to keep their books clear for the coming quarter. There have been some requests from buyers that steel companies name third quarter prices as soon as possible, but thus far there are no official intimations as whether any further advances are contemplated. In all probability the mills will want to give further study to their cost sheets under the current high wage level before coming to a decision.

Assuming that some consumers and jobbers have overbought for second quarter shipment as a protection against the possibility of still higher prices, an announcement at this time that present prices would remain in effect for the third quarter might result in postponement of some second quarter shipments to the third quarter.

During the past week there has been decidedly less pressure upon the mills to enter third quarter orders, indicating, perhaps, that a good many buyers are now disposed to await political and economic developments before making further commitments.

There are indications that some consumers and jobbers are now getting shipments of steel in greater volume than they are using them, with the result that stocks are being built up to a larger extent than has been the case in the past few months. A period of digestion would now appear to be in order.

Although domestic business has eased, this is not true of export. Inquiries from abroad have increased, but mills are unable to accept all of the business that is offered because of commitments to domestic customers and also because of insufficient vessel space, particularly to the Far East. Although the conference rate to the Far East on steel is \$6 a ton, this is frequently being disregarded, as high as \$8 having been quoted, while on pig iron and scrap quotations from \$9 to \$11 are not uncommon. An interesting export inquiry is for 75 locomotives for a Chinese railroad, on which American locomotive builders are quoting.

Pig Iron

There were relatively few domestic buyers in the market last week, although the demand for pig iron for foreign shipment is still considerable and continues to exceed offerings. Most furnaces are busy liquidating the large amount of tonnage already under contract to domestic users, a considerable portion of which is low-priced. Because the furnaces have little

additional iron to offer and consumers are well covered, the domestic market is quiet.

Reinforcing Steel

With spring and the building season at hand, the reinforcing bar market is showing new signs of life. A 600-ton award to Truscon Steel Co. for a section of the West Side elevated highway, an old project, was the largest this week, but a new development in Yonkers, the construction of a building for the Habirshaw Cable & Wire Corp., required 360 tons of bars, and also went to Truscon. A fair amount of tonnage has come in at the second quarter price, and the shading so prevalent over the past year is still greatly in evidence. A number of attractive new jobs are out, the most important being the Flushing River bridge, requiring 2385 tons of bars, bids on which were taken yesterday.

Secretary Perkins Calls Conference

WASHINGTON, April 13.—Pointing out that Supreme Court decisions of yesterday had established the Wagner Act as the law of the land, Secretary of Labor Perkins today announced a series of conferences of Government representatives and industrial and labor leaders "to stabilize industrial relations under collective bargaining."

The first conference, Miss Perkins said, will be held next Tuesday. Among those invited are Myron C. Taylor, chairman, United States Steel Corp.; Gerard Swope, General Electric Co.; W. C. Teagle, Standard Oil Co.; C. M. Chester, president, National Association of Manufacturers; Harper Sibley, president, Chamber of Commerce of the United States; Warren G. Madden, chairman, National Labor Relations Board; Jesse C. Jones, chairman Reconstruction Finance Corp.; John G. Winant, former chairman Social Security Board; John L. Lewis, chairman, Committee for Industrial Organization, and William Green, president, American Federation of Labor.

Miss Perkins said that the purpose of the meeting is to determine "the wisest procedures and safeguards that can be mutually agreed on as an orderly and constructive method for attaining this universally desired result," referring to industrial peace through collective bargaining.

It was intimated by Miss Perkins that collective bargaining codes might result from the conferences.

Mass Production Held to Be Interstate Commerce; Wagner Act Strengthens Centralized Power

(CONTINUED FROM PAGE 85)

A significant sentence from the majority opinion reads: "When industries organize themselves on a national scale, making their relation to interstate commerce the determinate factor in their activities, how can it be maintained that their industrial labor relations constitute a forbidden field into which Congress may not enter when it is necessary to protect interstate commerce from the paralyzing consequences of industrial war?"

It was pointed out that these circumstances of the operations of the company disclose a striking and intimate relation which a manufacturing industry may have to interstate commerce. The court summarized the analogous relation which manufacturing operations of this character bear to the operations of railroads and the like rights of the employees of each under comparable conditions.

Agreement with Employees not Compulsory

In discussing dealings of the company with its employees, the opinion said: "The act does not compel agreements between employers and employees. It does not compel any agreement whatever."

Nor, said the court, "The act does not interfere with the normal exercise of the right of the employer to select its employees or to discharge them." But the court pointed out that under cover of this right the employer may not intimidate or coerce its employees with respect to their self-organization and representation.

The court disposed of the criticism of the Wagner Act that it is one-sided in its application by the comment: "That it (the act) fails to provide a more comprehensive plan, with better assurance of fairness to both sides and with increased chances of success in bringing about, if not compelling equitable solution of industrial disputes affecting interstate commerce." The court further observed that, "We have frequently said that the legislative authority, exerted within its proper field, need not embrace all the evils within its reach."

The majority opinion is careful to point out that the National Labor Relations Board must proceed upon complaint, notice and hearings and that the board must receive evidence and make findings of facts which are conclusive, if supported by evidence. The court

also pointed out that the order of the board is subject to review by a Circuit Court of Appeals and that upon such review all questions of jurisdiction of the board and the regularity of its proceedings and all questions of constitutional right or statutory authority are open to examination by the court.

The Jones & Laughlin Steel Corp. withdrew from the hearing before board and declined to avail itself of the opportunity to present testimony, having taken the position that the act is unconstitutional and had no application to its manufacturing operations.

Both the majority and minority opinions of the Supreme Court buttress their conclusions by citations in the main to the same series of previous decisions of the court affecting interstate commerce, notably the NRA decision in the Schechter case. In that case the court unanimously held that interstate commerce had ceased, though pointing out that the NRA act contained unwarranted delegations of legislative power.

Minority Opinion Holds to States Rights

The minority opinion, read by Mr. Justice McReynolds, insisted that the court departed from well established principles followed in the Schechter case and in the Guffey Coal Act case wherein the latter act set aside only to be replaced a new act which has gone to the President.

The minority opinion said: "The discharged employees labored only in the manufacturing department. They took no part in the transportation to or away from the plant; nor did they participate in any activity which preceded or followed manufacture."

The dissenting opinion concluded its comment upon the Jones & Laughlin case as follows:

"The Constitution still recognizes the existence of states with indestructible powers; the tenth amendment was supposed to put them beyond controversy."

The Jones & Laughlin case was one of five decisions involving the National Labor Relations Act determined yesterday. In each instance the constitutionality of the act was upheld, in five cases by same five to four vote as in the Jones & Laughlin case and in one case, that of the Washington, Virginia & Maryland Coach Co., is was upheld by a unanimous vote. The other cases concerned the

Fruehauf Trailer Co., Friedman-Harry Marks Clothing Co., Inc., and the Associated Press. Principles laid down in the 22-page decision in the Jones & Laughlin case were applied to the other cases.

Trend Toward Centralization of Power

After reviewing all these decisions, Nathan Boone Williams, well-known Washington lawyer, long a student of constitutional and industrial questions, made the following comment to THE IRON AGE:

"The real issue presented by these and other recent decisions of the Supreme Court of the United States serves to bring into bold relief the fundamental conflict now disturbing American business and professional thought. That question is whether we are to continue to further centralization of all power over the business and activities of the citizens in the Federal Government and attempt to completely direct such activities from Washington. This is a question of policy which will challenge the best thought of Congress and the country.

"There is now no need to base attempted regulation of business activities on the use of the mails or other means of communication.

"The administration of the anti-trust acts, as amended by the Robinson-Patman Act, the Federal Trade Commission Act, the Securities and Exchange Act, and the Federal Communications Act are much strengthened by these decisions.

"The test appears to be the activities of the business under review and not the separate parts of such business, whether manufacturing or commercial.

"Very likely the instant question will arise as to whether or not and to what degree business enterprise may not find it instantly advisable to separate their manufacturing and sales activities—possibly purchasing—into separate corporations so as make plain that their manufacturing operations are in fact local in scope and activity. Many companies now so conduct their operations.

"Franklin K. Lane once said, 'If we did not have states we would have to create them.' Corporate management may not longer hope to either evade or avoid its full responsibility to deal with its problem of employment relations and its relations to both state and Federal government, frequently in the past neglected, while it has so abundantly met its responsibility to provide a growing volume of goods and services to its customers."



FABRICATED STEEL

... Lettings in good volume at 42,300 tons as against 36,650 tons last week.

• • •

... New projects decline to 12,000 tons from 19,510 tons a week ago.

NORTH ATLANTIC STATES

Bridgeport, Conn., 1100 tons, Bridgeport Brass Co. units, to American Bridge Co.

Rumford-Mexico, Me., 424 tons, State bridge, to Harris Structural Steel Co., Plainfield, N. J.

Wellesley, Mass., 300 tons, State bridge, Boston Bridge Works, Inc.

Royalston, Mass., 100 tons, State bridge, to Boston Bridge Works, Inc.

Worcester, Mass., 400 tons, addition to factory building, Norton Co., to Eastern Bridge & Structural Co., Worcester.

Hartford, 250 tons, addition to building, Connecticut General Life Insurance Co., to Bethlehem Fabricators, Inc., Bethlehem, Pa.

Waterbury, Conn., 500 tons, transmission towers, Connecticut Light & Power Co., to Bethlehem Steel Co.

New York, 8700 tons, express highway viaduct, West 135th to West 146th Streets, New York Central Railroad, to Bethlehem Steel Co.

New York, 3900 tons, express highway viaduct, West 153rd to West 160th Streets, New York Central Railroad, to American Bridge Co.

New York, 1150 tons, addition to public school No. 117 in Bronx, to Bethlehem Steel Co.

Brooklyn, 850 tons, public school No. 253, to Bethlehem Steel Co.

Brooklyn, 380 tons, public school No. 169, to Harris Structural Steel Co.

Buffalo, 5000 tons, Chevrolet motor and axle plant, to Bethlehem Steel Co.

Rochester, N. Y., 1950 tons, building, Pfaudler Co., to Leach Steel Corp., Rochester.

Schenectady, 500 tons, grade crossing elimination, New York Central Railroad, to Bethlehem Steel Co.

Delair, N. J., 130 tons, Kieckhefer Container Co., to Bethlehem Steel Co.

Tamaqua, Pa., 160 tons, Reading Co. bridge, to Bethlehem Steel Co.

Erie, Pa., 230 tons, General Electric Co. building, to Erie Steel Construction Co., Erie.

Bethlehem, Pa., 160 tons, service building, to Bethlehem Contracting Co.

Pittsburgh, 125 tons, H. J. Heintz Co. building, to Fort Pitt Bridge Works.

Juniata County, Pa., 1315 tons, highway bridge, to American Bridge Co.

Chester, Pa., 145 tons, addition to Scott Paper Co. plant, to Belmont Iron Works, Philadelphia.

Bolivar, Pa., 320 tons, bridge, to Fort Pitt Bridge Works Co.

Amcelle, Pa., 240 tons, Celanese Corp. building, to Belmont Iron Works.

Crystal City, Pa., 770 tons, Pittsburgh Plate Glass Co. buildings, to Stupp Brothers Bridge & Iron Co., St. Louis.

Baltimore, 250 tons, plant addition, National Can Co., to American Bridge Co.

Washington, 475 tons, telephone building, to Barber & Ross, Washington.

THE SOUTH

Owensboro, Ky., 400 tons, factory buildings, Ken-Rad Corp., to International Steel Co., Evansville, Ind.

Guntersville, Ala., 550 tons, embedded parts for dam, to Lakeside Bridge & Steel Co., Milwaukee.

Burleson County, Tex., 110 tons, bridge, to North Texas Iron & Steel Co.

Fort Worth, Tex., 110 tons, overpass, to Virginia Bridge Co., Roanoke, Va.

Houston, Tex., 240 tons, railroad bridge, to American Bridge Co.

CENTRAL STATES

Pontiac, Mich., 250 tons, warehouse addition, Baldwin Rubber Co., to Whitehead & Kales Co., Detroit.

Jackson, Mich., 200 tons, office and factory building, Thorrez-Maes Co., to Austin Co., Cleveland.

Detroit, 250 tons, manufacturing and office building, LaChoy Food Products Co., to Taylor & Gaskin Co.

Indiana Harbor, Ind., 5000 tons, Inland Steel Co., to Wisconsin Bridge & Iron Co., North Milwaukee.

Cincinnati, 145 tons, building for Cincinnati Shaper Co., to Pittsburgh Bridge & Iron Co., Pittsburgh.

Dixon, Ill., 510 tons, State hospital, to Duffin Iron Works, Chicago.

La Fayette, Ind., 1525 tons, field house, to American Bridge Co.

Sac County, Iowa, 150 tons, beam spans, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Wausau, Wis., 150 tons, post office, to Wausau Iron Works, Wausau.

Sheboygan, Wis., 250 tons, junior high school, to Fort Pitt Bridge Works Co.

Milwaukee, 100 tons, grandstand roof at State Fair Park, to C. Hennecke Co.

WESTERN STATES

San Francisco, 100 tons, Crown Products Co. plant, to Golden Gate Iron Works, San Francisco.

San Francisco, 180 tons, ferry aprons for Yerba Buena Island, to Minneapolis-Moline Power Implement Co., Minneapolis.

Los Angeles, 445 tons, Roosevelt highway bridge, to Minneapolis-Moline Power Implement Co.

Los Angeles, 107 tons, Brand Boulevard bridge, to an unnamed bidder.

Sacramento, Cal., 1700 tons, depot supply building for Government, to Ingalls Iron Works Co., Birmingham.

NEW STRUCTURAL STEEL PROJECTS NORTH ATLANTIC STATES

West Point, N. Y., 250 tons, quartermaster garage.

Verona, N. Y., 350 tons, New York Central grade crossing elimination.

Menanda, N. Y., 350 tons, building, Boyertown Casket Co.

Ithaca, N. Y., 300 tons, overhead highway bridge, Lehigh Valley Railroad.

Albany, N. Y., 200 tons, transit shed No. 5, Albany Port District Commission.

Jordan, N. Y., 250 tons, New York Central grade crossing elimination.

Buffalo, 200 tons, addition to Eastern States Milling Company.

Bucks County, Pa., 160 tons, State highway work; bids April 16.

Beaver County, Pa., 380 tons, State highway work; bids April 23.

Huntingdon County, Pa., 140 tons, State highway work; bids April 23.

Chester-Delaware Counties, Pa., 480 tons, State highway work; bids April 23.

SOUTH AND SOUTHWEST

Dallas, Tex., 600 tons, Coca-Cola building.

Oklahoma City, 500 tons, State office building.

CENTRAL STATES

Detroit, 350 tons, DeSoto Motor Co. plant addition; Albert Kahn, architect.

Springfield, Ohio, 400 tons, Ohio Edison Co. plant addition.

Cleveland, 700 tons, Lakefront Boulevard bridges; new bids April 16.

Akron, Ohio, 650 tons, South Main Street and East Miller Avenue grade crossing separation; new bids April 20.

Toledo, Ohio, 700 tons, Lucas County bridge; C. B. Moon Co., Cleveland, low bidder.

Canton, Ohio, 800 tons, mill buildings, Timken Roller Bearing Co.

Chicago, 250 tons, factory building, Alco Gravure Co.

Chicago, 1800 tons, 103rd Street viaduct.

Streator, Ill., 350 tons, decorating building, Owens-Illinois Glass Co.

Peoria, Ill., 500 tons, addition to power station, Central Illinois Light Co.

Pike County, Ill., 245 tons, bridge.

St. Charles, Ill., 1800 tons, bridge.

WESTERN STATES

Seattle, 5500 tons, galvanized fabricated steel for transmission towers for Skagit line; bids advanced to April 22.

Los Angeles, 130 tons, Metropolitan Water District; bids April 23.

Potholes, Cal., 500 tons, track rack for Imperial Dam; Specification 910-D, Bureau of Reclamation.

SHEET PILING

NEW PROJECTS

Cap au Gris, Mo., 7000 tons, dam across Mississippi River.

Oklahoma City, 300 tons, public utility project.

Tomahawk, Wis., 280 tons, Wisconsin Public Service Co.

North Loup, Neb., 400 tons, Federal project.

Arcadia, Neb., 500 tons, Middle Loup project; Kohler Construction Co., low bidder.

Potholes, Cal., 600 tons, Bureau of Reclamation.



...NON-FERROUS...

... All non-ferrous metals reduced in price during the week.

... Copper stocks declined 14,700 tons in March.

NEW YORK, April 13.—Custom smelters reduced copper prices ½c. a lb. on April 8 to the basis of 15.50c. for electrolytic, delivered Connecticut Valley. The decline came about as a result of further pronounced weakness in practically all metals, including copper, in London last week. Mine producers, however, have made no

change in the price to domestic customers, so that their quotation holds at 16.00c. With the market in a decline, consumers bought about 4700 tons last week for domestic shipment, against approximately 17,500 tons in the week before. Yesterday they bought 851 tons, although currently there is said to be a greater demand for

spot metal than indicated by sales. Demand for export copper is noticeably lighter, and sales in this direction today ranged between 15.00c. and 15.10c., c.i.f., European ports. The duty-free copper statistics for March showed a decrease of 14,673 tons in domestic refined stocks.

Lead

The base price for pig lead was reduced \$18 a ton on April 7 to 5.85c. a lb., St. Louis, and 6.00c., New York. St. Joseph Lead Co., whose quotation had been \$2 above the base, dropped its price \$20 a ton, but continued to demand a \$1 premium on certain brands sold in the East. Demand at the lower levels revived, as consumers bought for May delivery. Estimates place shipments of lead in March at around 60,000 tons. The new price for the metal is firm, and buyers are expected to continue May purchases, as that month's requirements are only about 45 per cent covered to date.

Zinc

The price broke \$10 a ton on April 7 to 7.00c. a lb., East St. Louis basis, as zinc in London weakened to a point below the theoretical level at which imports are possible. One producer did not concur fully in the decline, and has established its quotation at 7.25c., or \$5 a ton above the level at which all the new business is being booked. Currently, demand for zinc is moderate, though galvanizers continue to press for shipment on existing contracts. Stocks of all grades of slab zinc at the end of March showed a drop of 6433 tons. Shipments in April were 59,635 tons, and production totaled 53,202 tons. This represented an increase over February of 12,682 tons and 15,408 tons respectively.

Tin

Fears that President Roosevelt intended to reduce the price of gold unsettled the market last week, but, following his statement on April 9, buyers regained confidence. Substantial trading in tin has occurred since then. The spot Straits price at New York today is 60.62½c., or somewhat above its average level for the week. This morning in London standard quotations were £272 5s. spot and £269 5s. futures. The Eastern price was £271 10s.

Ingot Brass and Bronze

Average prices received by members of the Non-Ferrous Ingot Metal Institute during the 28-day period ended March 19 on commercial 80-10-10 and commercial 85-5-5 brass ingots were 18.588c. and 16.409c. a lb. respectively. Preceding prices were 15.965c. and 13.820c.

The Week's Prices. Cents Per Pound for Early Delivery

	Apr. 7	Apr. 8	Apr. 9	Apr. 10	Apr. 12	Apr. 13†
Electrolytic copper, Conn.*....	16.00	15.50	15.50	15.50	15.50	15.50
Lake copper, N. Y.....	16.12½	15.62½	15.62½	15.62½	15.62½	15.62½
Straits tin, spot, New York....	60.00	60.25	60.62½	60.00	60.62½	60.62½
Zinc, East St. Louis.....	7.00	7.00	7.00	7.00	7.00	7.00
Zinc, New York.....	7.35	7.35	7.35	7.35	7.35	7.35
Lead, St. Louis.....	5.85	5.85	5.85	5.85	5.85	5.85
Lead, New York.....	6.00	6.00	6.00	6.00	6.00	6.00

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.

†Noon Price.

Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb. delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 17.00c. a lb., New York.
Quicksilver, \$91.00 to \$93.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 15.25c. a lb. delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig.....	62.00c. to 63.00c.
Tin, bar.....	64.00c. to 65.00c.
Copper, Lake.....	17.25c. to 18.25c.
Copper, electrolytic.....	17.25c. to 18.25c.
Copper, castings.....	17.25c. to 18.25c.
*Copper sheets, hot-rolled.....	23.62½c.
*High brass sheets.....	21.12½c.
*Seamless brass tubes.....	23.87½c.
*Seamless copper tubes.....	24.37½c.
*Brass rods.....	17.50c.
Zinc, slabs.....	8.25c. to 9.25c.
Zinc, sheets (No. 9), casks, 1200 lb. and over.....	13.75c.
Lead, American pig.....	7.00c. to 8.00c.
Lead, bar.....	8.00c. to 9.00c.
Lead, sheets, cut.....	10.50c.
Antimony, Asiatic.....	18.00c. to 19.00c.
Alum., virgin, 99 per cent plus.....	24.30c.
Alum., No. 1 for remelting, 98 to 99 per cent.....	19.50c. to 21.00c.
Solder, ½ and ½.....	39.00c. to 41.00c.
Babbitt metal, commercial grades.....	25.00c. to 65.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33½ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig.....	64.00c.
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Tin, bar.....	66.00c.
Copper, Lake.....	17.00c. to 17.25c.
Copper, electro-lytic.....	17.00c. to 17.25c.
Copper, castings.....	16.75c. to 17.00c.
Zinc, slabs.....	8.75c. to 9.00c.
Lead, American pig.....	6.50c. to 6.75c.
Lead, bar.....	10.00c.
Antimony, Asiatic.....	18.75c.
Babbitt metal, medium grade.....	24.50c.
Babbitt metal, high grade.....	68.00c.
Solder, ½ and ½.....	39.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	12.37½c.	13.12½c.
Copper, hvy. and wire.....	11.75c.	12.25c.
Copper, light and bottoms.....	10.75c.	11.00c.
Brass, heavy.....	7.25c.	7.87½c.
Brass, light.....	6.00c.	6.75c.
Hvy. machine composition.....	10.50c.	11.00c.
No. 1 yel. brass turnings.....	7.62½c.	8.12½c.
No. 1 red brass or compos. turnings.....	10.12½c.	10.62½c.
Lead, heavy.....	5.00c.	5.37½c.
Cast aluminum.....	12.12½c.	13.25c.
Sheet aluminum.....	13.25c.	14.75c.
Zinc.....	4.00c.	4.37½c.



IRON AND STEEL SCRAP

... Price sentiment very weak in most important consuming centers.

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... Composite figure off 50c. to \$21.42.

APRIL 13.—After one of the most spectacular periods of rising prices in the history of scrap, the market is currently very wobbly in practically every consuming center. As was anticipated, the first sign of hesitancy brought out a flood of accumulations which were being held for even higher price levels, the consequence being that buyers are well able to meet all their requirements and even engage in a little price pressure. The result has been a 50c. decline at Pittsburgh and a \$1 drop at Chicago, which are reflected in a 50c. decline in THE IRON AGE composite figure to \$21.42.

From the tone of most markets today, it is quite likely that the weakness in prices has still not run its course. In the East, the price schedules had not yet been altered, mostly on the strength of sustained export activity. However, the lack of boats will probably keep brokers from taking many additional export orders for delivery over the next few months.

Pittsburgh

With all large buyers out of the market, an easier tone is in evidence. The tendency to take no more steel scrap has even extended itself to dealers, several of whom are not interested at the time in making any commitments. Of considerable importance in relation to the No. 1 steel market is the extreme weakness in No. 2 steel. Recent railroad embargoes in the Southwest resulted in a heavy volume of this material finding its way into this and the Youngstown district. Supplies are considerably in excess of demand. In view of the above factors, and since some dealers can obtain No. 1 steel at around \$22 to \$22.50, the market is off 50c. this week, making No. 1 steel quotable at \$22.50 to \$23. Railroad heavy melting is also off 50c. a ton. Specialties, on the other hand, are strong with the recent railroad list having brought \$23.

Chicago

The break in this market has brought

the inevitable—that is quick releases by those who had been holding for higher prices. The net result is that distress tonnages are forcing prices to lower. Mills have put on restrictions, and their inspections are so close that rejections are running high. Producers who have been accumulating tonnages to take advantage of a rising market are now unloading as fast as scrap is produced, and some are selling ahead of actual production. Country dealers are being heard from whose names are unfamiliar to local brokers.

Cleveland

Prices have taken another drop of 50c. a ton on steel-making grades in the Cleveland and Youngstown districts, and the market has a weak tone. Shipments to the Youngstown district are still being held up, and more scrap is coming on the market than for some time. Blast furnace grades are steady with quotations unchanged. No new consumer purchases from brokers are reported. In spite of the weak tone of the market, the New York Central Railroad scrap went at high prices last week. No. 1 steel brought \$23 and \$23.50, long rails \$26, short rails, \$27, couplers, springs and steel wheels, \$28.

Philadelphia

The market is showing some weakness, but so far no mill sales have been made at lower levels. Material seems to be moving freely, and district mills apparently have good scrap piles on hand. The Budd bundles, which were reported last week as having been divided among three buyers, are understood to have brought in the neighborhood of \$21. It has been stated that the price obtained by the Pennsylvania Railroad for its latest No. 1 accumulation, was slightly under \$24. Exports are proceeding normally under the permit system as explained last week, and there is no cessation of new foreign inquiry. Three boats are now loading scrap for export at Port Richmond.

Buffalo

The market is held by most dealers to be considerably weaker. The mark-off is about \$1.50 on each item. The largest consumer abruptly dropped its offering price to \$20 for No. 1 steel and

\$18.50 for No. 2. Dealers blame the weakness on an abnormally fast rise in prices, along with the break in the copper market and a general desire of dealers to unload. Lake shipments have already begun to arrive, and this likewise has been a softening factor.

Boston

Brokers are rather up in the air regarding prices, consequently they have curtailed their activities. On the other hand, owners of scrap are resisting reductions in price offers, consequently quotations are largely nominal. Exporters are cleaning up old contracts and buying only to fill out special lots of scrap. The bulk of recent exports have been going to Germany and Japan. Congestion at local docks is practically eliminated.

New York

Dealers here reduced their buying prices for heavy melting steel on cars 50c. a ton last week to \$17 to \$17.50 for No. 1 and \$15.50 to \$16 for No. 2. Heavy breakable cast and unprepared yard scrap were likewise lowered 50c. a ton. While other grades are unchanged at the moment, the undertone of the market is weaker throughout, and reflects bearish sentiment on the part of consumers who are restraining purchases in expectation of being able to buy at reduced prices later on. This feeling that prices will be lower has also affected foreign buyers, and less export inquiry has resulted. Dealers' buying prices for truck delivery to the docks are 50c. a ton lower on No. 2 cast scrap, but otherwise are unchanged.

Cincinnati

The old materials market softened the past week under rumors of easing in other areas and reports of consumer effort to reduce raw material costs. Dealers' bids are down 50c., but the trade is warily watching developments. Material is moving on contract, and some new sales for fair quantities are reported.

St. Louis

Offerings of scrap iron by country dealers to St. Louis dealers are increasing, and, in addition, the mills in this district are badly congested. However, the market is unchanged, largely as a result of sustained strength in certain Eastern consuming centers. The only railroad list of the week was the Missouri-Pacific's 100 carloads.

Detroit

Chrysler sales disposing of scrap for April helped this week to spot points on the downward curve of scrap prices. Borings and turnings went \$1 below the recently quoted peak, short shoveling turnings slid off 75c., but hydraulic compressed sheets held to the quoted peak level. Sellers have found conditions difficult, and 50c. to \$1 drops have been general here. Reports indicate that the market for No. 2 steel is glutted with Southwestern scrap.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$22.50 to \$23.00
Railroad hvy. mltng.	23.50 to 24.00
No. 2 hvy. mltng. steel	18.50 to 19.00
No. 2 RR. wrought	22.50 to 23.00
Scrap rails	23.50 to 24.00
Rails 3 ft. and under	26.50 to 27.00
Comp. sheet steel	22.50 to 23.00
Hand. bundled sheets	20.00 to 20.50
Hvy. steel axle turn.	21.00 to 21.50
Machine shop turn.	14.50 to 15.00
Short shov. turn.	15.50 to 16.00
Mixed bor. & turn.	14.50 to 15.00
Cast iron borings	14.50 to 15.00
Cast iron carwheels	19.50 to 20.00
Hvy. breakable cast.	16.00 to 16.50
No. 1 cast	20.00 to 20.50
RR. knuckles & cplrs.	27.50 to 28.00
Rail coil & leaf springs	27.50 to 28.00
Rolled steel wheels	27.50 to 28.00
Low phos. billet crops	28.00 to 28.50
Low phos. sh. bar	27.00 to 27.50
Low phos. punchings	25.00 to 25.50
Low phos. plate, hvy.	26.50 to 27.00
Low phos. plate clip.	25.00 to 25.50
Steel car axles	26.00 to 26.50

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$20.00 to \$20.50
No. 2 hvy. mltng. steel	18.50 to 19.00
Comp. sheet steel	19.00 to 19.50
Light bund. stampings	15.00 to 15.50
Drop forge flashings	18.50 to 19.00
Machine shop turn.	13.50 to 14.00
Short shov. turn.	14.50 to 15.00
No. 1 busheling	19.00 to 19.50
Steel axle turnings	16.50 to 17.00
Low phos. billet and bloom crops	26.00 to 26.25
Cast iron borings	14.50 to 15.00
Mixed bor. & turn.	14.50 to 15.00
No. 2 busheling	14.50 to 15.00
No. 1 cast	20.50 to 21.00
Railroad grate bars	12.00 to 12.50
Stove plate	10.00 to 10.50
Rails under 3 ft.	25.00 to 25.50
Rails for rolling	21.50 to 22.00
Railroad malleable	21.00 to 21.50
Cast iron carwheels	22.00 to 22.50

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$20.50 to \$21.00
No. 2 hvy. mltng. steel	19.50 to 20.00
Hydraulic bund., new	19.50 to 20.00
Hydraulic bund., old	17.00
Steel rails for rolling	22.00 to 23.00
Cast iron carwheels	21.50 to 22.00
Hvy. breakable cast	20.00 to 20.50
No. 1 cast	22.50 to 23.00
Stove plate (steel wks.)	17.00 to 17.50
Railroad malleable	19.50 to 20.00
Machine shop turn.	14.50 to 15.00
No. 1 blast furnace	13.50 to 14.00
Cast borings	13.50 to 14.00
Heavy axle turnings	18.00 to 18.50
No. 1 low phos. hvy.	25.00 to 25.50
Couplers & knuckles	25.00 to 25.50
Rolled steel wheels	25.00 to 25.50
Steel axles	25.50 to 26.00
Shafting	25.00 to 26.00
No. 1 RR. wrought	20.00 to 21.00
Spec. iron & steel pipe	17.50 to 18.00
No. 1 forge fire	17.50 to 18.00
Cast borings (chem.)	14.00 to 15.00

CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mltng. steel	\$20.50 to \$21.00
Auto. hvy. mltng. steel	18.50 to 19.00
Alloy free	18.00 to 18.50
Shovel'ng steel	20.50 to 21.00
Hydraul. comp. sheets	19.50 to 20.00
Drop forge flashings	16.50 to 17.00
No. 1 busheling	19.00 to 19.50
Rolled carwheels	23.50 to 24.00
Railroad tires, cut	24.00 to 24.50
Railroad leaf springs	23.50 to 24.00
Steel coup. & knuckles	23.50 to 24.00
Axle turnings	18.50 to 19.00
Coil springs	24.50 to 25.00
Axle turn. (elec.)	21.00 to 21.50
Low phos. punchings	23.50 to 24.00
Low phos. plates, 12 in. and under	23.50 to 24.00
Cast iron borings	12.75 to 13.25
Short shov. turnings	12.75 to 13.25
Machine shop turn.	11.50 to 12.00
Rerolling rails	23.50 to 24.00
Steel rails under 3 ft.	23.25 to 23.75
Steel rails under 2 ft.	25.00 to 25.50
Angles bars, steel	23.50 to 24.00
Cast iron carwheels	21.50 to 22.00
Railroad malleable	22.00 to 22.50
Agric. malleable	18.75 to 19.25
Iron car axles	26.50 to 27.00

Per Net Ton

Steel car axles	\$24.50 to \$25.00
No. 1 RR. wrought	18.25 to 18.75
No. 2 RR. wrought	18.25 to 18.75
No. 2 busheling, old	9.00 to 9.50
Locomotive tires	19.50 to 20.00
Pipes and flues	14.50 to 15.00
No. 1 machinery cast	17.50 to 18.00
Clean auto. cast	16.00 to 16.50
No. 1 railroad cast	16.25 to 16.75
No. 1 agric. cast	14.00 to 14.50
Stove plate	12.50 to 13.00
Grate bars	14.00 to 14.50
Brake shoes	14.00 to 14.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mltng. steel	\$19.50 to \$20.00
No. 2 hvy. mltng. steel	18.00 to 18.50
Scrap rails	19.50 to 20.00
New hvy. b'ndled sheet	18.00 to 18.50
Old hydraul. bundles	17.00 to 17.50
Drop forge flashings	18.00 to 18.50
No. 1 busheling	18.00 to 18.50
Hvy. axle turnings	14.00 to 14.50
Machine shop turn.	12.50 to 13.00
Knuckles & couplers	22.00 to 22.50
Coil & leaf springs	22.00 to 22.50
Rolled steel wheels	22.00 to 22.50
Low phos. billet crops	22.50 to 23.00
Shov. turnings	14.00 to 15.00
Mixed bor. & turn.	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Steel car axles	20.50 to 21.00
No. 1 machinery cast	18.00 to 18.50
No. 1 cupola cast	17.00 to 17.50
Stove plate	14.00 to 14.50
Steel rails under 3 ft.	22.50 to 23.00
Cast iron carwheels	17.50 to 18.00
Railroad malleable	20.50 to 21.00
Chemical borings	13.00 to 13.50

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$15.00 to \$18.00
Scrap steel rails	17.00 to 19.00
Short shov. turnings	9.00 to 10.00
Stove plate	9.00 to 10.50
Steel axles	18.00 to 19.00
Iron axles	16.50 to 18.00
No. 1 RR. wrought	13.00 to 15.00
Rails for rolling	18.00 to 20.00
No. 1 cast	16.00 to 18.00
Tramcar wheels	16.00 to 17.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:	
Selected hvy. steel	\$18.50 to \$19.00
No. 1 hvy. melting	18.00 to 18.50
No. 2 hvy. melting	16.00 to 16.50
No. 1 locomotive tires	20.00 to 20.50
Misc. stand.-sec. rails	19.00 to 19.50
Railroad springs	21.50 to 22.00
Bundled sheets	11.00 to 11.50
No. 2 RR. wrought	18.00 to 18.50
No. 1 busheling	14.00 to 14.50
Cast bor. & turn.	7.50 to 8.00
Rails for rolling	20.00 to 20.50
Machine shop turn.	9.00 to 9.50
Heavy turnings	14.00 to 14.50
Steel car axles	21.50 to 22.00
Iron car axles	22.00 to 22.25
No. 1 RR. wrought	15.50 to 16.00
Steel rails under 3 ft.	20.00 to 20.50
Steel angle bars	19.25 to 19.75
Cast iron carwheels	19.00 to 19.50
No. 1 machinery cast	15.00 to 15.50
Railroad malleable	19.50 to 20.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricul. malleable	12.50 to 13.00
Grate bars	12.00 to 12.50
Brake shoes	13.50 to 14.00

CINCINNATI

Dealer's buying prices per gross ton:	
No. 1 hvy. mltng. steel	\$18.25 to \$18.75
No. 2 hvy. mltng. steel	16.25 to 16.75
Scrap rails for mltng.	21.50 to 22.00
Loose sheet clippings	14.00 to 14.50
Bundled sheets	16.00 to 16.50
Cast iron borings	11.50 to 12.00
Machine shop turn.	12.25 to 12.75
No. 1 busheling	15.50 to 16.00
No. 2 busheling	10.00 to 10.50
Rails for rolling	23.00 to 23.50
No. 1 locomotive tires	17.50 to 18.00
Short rails	23.50 to 24.00
Cast iron carwheels	18.00 to 18.50
No. 1 machinery cast	17.50 to 18.00
No. 1 railroad cast	16.50 to 17.00
Burnt cast	12.00 to 12.50
Stove plates	12.00 to 12.50
Agricul. malleable	17.50 to 18.00
Railroad malleable	19.00 to 19.50

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel	\$17.00 to \$17.50
No. 2 hvy. mltng. steel	15.75 to 16.25
Borings and turnings	12.50 to 13.00
Long turnings	12.50 to 13.00
Short shov. turnings	13.50 to 14.00
No. 1 machinery cast	17.25 to 17.75
Automotive cast	17.50 to 18.00
Hydraul. comp. sheets	19.00 to 19.50
Stove plate	11.25 to 11.75
New factory bushel	16.75 to 17.25
Old No. 2 busheling	11.50 to 12.00
No. 2 busheling (black fender stock)	12.75 to 13.25
Sheet cl'ppings	13.50 to 14.00
Flashings	16.00 to 16.50
Low phos. plate scrap	18.00 to 18.50

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$21.50 to \$22.00
Hydraulic bundles	21.00 to 21.50
Machine shop turn	15.00 to 15.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel	\$17.00 to \$17.50
No. 2 hvy. mltng. steel	15.50 to 16.00
Hvy. breakable cast	15.00 to 15.50
No. 1 machinery cast	16.75 to 17.25
No. 2 cast	15.00 to 15.50
Stove plate	13.00 to 13.50
Steel car axles	25.00 to 26.00
Shafting	20.00 to 20.50
No. 1 RR. wrought	17.50 to 18.00
No. 1 wrought long	16.50 to 17.00
Spec. iron & steel pipe	14.50 to 15.00
Rails for rolling	18.50 to 19.00
Clean steel turnings	9.00 to 9.50
Cast borings	10.00 to 10.50
No. 1 blast furnace	10.00 to 10.50
Cast borings (chem.)	12.00 to 12.50
Unprepar. yard scrap	10.50 to 11.00
Per gross ton, delivered local boundaries:	
No. 1 machn. cast	\$18.00 to \$18.50
No. 1 hvy. cast cupola	15.50 to 16.00
No. 2 cast	14.50 to 15.00
Add 50c. to 75c. to above quotations to secure North Jersey prices.	

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel	\$16.30 to \$16.80
Scrap rails	16.30 to 16.80
No. 2 steel	15.25 to 15.75
Breakable cast	14.60 to 15.50
Machine shop turn	9.50 to 9.85
Mixed bor. & turn.	7.50 to 9.20
Bund. skeleton long	13.50 to 13.75
Shafting	19.00 to 19.50
Cast bor. chemical	9.50 to 10.25
Per gross ton delivered consumers' yards:	
Textile cast	\$17.00 to \$19.00
No. 1 machine cast	17.00 to 19.00
Stove plate	10.00 to 10.50

CANADA

Dealers' buying prices at their yards, per gross ton	
Toronto Montreal	
No. 1 hvy. mltng. stl.	\$13.50 \$13.00
No. 2 hvy. mltng. stl.	12.50 12.00
Mixed dealers steel	12.00 11.75
Scrap pipe	10.25 9.75
Steel turnings	9.00 8.50
Cast borings	9.75 9.50
Machinery cast	17.50 17.00
Dealers cast	15.50 15.00
Stove plate	13.00 12.75

EXPORT

Dealers' buying prices per gross ton:	
New York, truck lots, delivered, barges.	
No. 1 hvy. mltng. steel	\$17.50 to \$18.00
No. 2 hvy. mltng. steel	16.50 to 17.00
No. 2 cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Steel rails (scrap)	17.50 to 18.00
Boston on cars at Army Base or Westic Wheel	
No. 1 hvy. mltng. steel	\$17.00 to \$17.50
No. 2 hvy. mltng. steel	16.00 to 17.00
Rails (scrap)	17.00 to 17.50
Stove plate	14.50
No. 2 cast	14.75 to 15.00
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel	18.50
No. 2 hvy. mltng. steel	17.50
New Orleans, J.A.S., Stuyvesant Dock	
No. 1 hvy. mltng. steel	17.50
No. 2 hvy. mltng. steel	16.50
Los Angeles, on cars or trucks at local piers	
No. 1 hvy. mltng. steel	\$10.50 to \$11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton
Rerolling\$37.00
Forging quality 43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open-hearth or Besse-mer\$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared2.10c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton
F.o.b. Pittsburgh or Cleveland.\$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind. 48.00
F.o.b. Worcester, Mass. 49.00
F.o.b. Birmingham 50.00
F.o.b. San Francisco 56.00
F.o.b. Galveston 53.00
Rods over 9/32 in. to 47/64 in., inclusive, \$5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.
F.o.b. Pittsburgh 2.45c.
F.o.b. Chicago or Gary 2.50c.
F.o.b. Duluth 2.60c.
Del'd Detroit 2.60c.
F.o.b. Cleveland 2.50c.
F.o.b. Buffalo 2.55c.
Del'd Philadelphia 2.74c.
Del'd New York 2.78c.
F.o.b. Birmingham 2.60c.
F.o.b. cars dock Gulf ports... 2.85c.
F.o.b. cars Pacific ports 3.00c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill. 2.35c.
F.o.b. Buffalo 2.40c.
F.o.b. Birmingham 2.45c.
F.o.b. cars dock Gulf ports... 2.70c.
F.o.b. cars dock Pacific ports.. 2.85c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)
F.o.b. Pittsburgh 2.55c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.60c.
Del'd Detroit 2.70c.
F.o.b. cars dock Gulf ports ... 2.95c.
F.o.b. cars dock Pacific ports.. 2.95c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)
F.o.b. Pittsburgh 2.40c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.45c.
F.o.b. cars dock Gulf ports.... 2.80c.
F.o.b. cars dock Pacific ports.. 2.80c.

Iron

F.o.b. Chicago 2.40c.
F.o.b. Pittsburgh (refined) 3.60c.

Cold Finished Bars and Shafting*

Base per Lb.
F.o.b. Pittsburgh 2.90c.
F.o.b. Cleveland, Chicago and Gary 2.95c.
F.o.b. Buffalo 3.00c.
F.o.b. Detroit 2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago or Gary 2.30c.
Del'd Cleveland 2.435c.
F.o.b. Coatesville or Spar. Pt. 2.35c.
Del'd Philadelphia 2.435c.
Del'd New York 2.53c.
F.o.b. Birmingham 2.40c.

F.o.b. cars dock Gulf ports.... 2.65c.
F.o.b. cars dock Pacific ports.. 2.80c.
Wrought iron plates, f.o.b. Pittsburgh 3.80c.

Floor Plates

F.o.b. Pittsburgh 3.80c.
F.o.b. Chicago 3.85c.
F.o.b. Coatesville 3.90c.
F.o.b. cars dock Gulf ports.... 4.20c.
F.o.b. cars dock Pacific ports.. 4.35c.

Structural Shapes

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago 2.30c.
Del'd Cleveland 2.435c.
F.o.b. Buffalo or Bethlehem.. 2.35c.
Del'd Philadelphia 2.455c.
Del'd New York 2.5025c.
F.o.b. Birmingham (standard) 2.40c.
F.o.b. cars dock Gulf ports.... 2.65c.
F.o.b. cars dock Pacific ports.. 2.80c.

Steel Sheet Piling

Base per Lb.
F.o.b. Pittsburgh 2.60c.
F.o.b. Chicago or Buffalo 2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports 3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton\$42.50
Angle bars, per 100 lb. 2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton\$43.00
Light rails (from rail steel) per gross ton 42.00

Base per Lb.
Spikes 3.15c.
Tie plates, steel 2.30c.
Tie plates, Pacific Coast ports.. 2.40c.
Track bolts, to steam railroads, 4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)

65-5 per cent off list
Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

Base per Lb.
No. 10, f.o.b. Pittsburgh 2.40c.
No. 10, f.o.b. Gary 2.50c.
No. 10, del'd Detroit 2.60c.
No. 10, del'd Philadelphia..... 2.69c.
No. 10, f.o.b. Granite City..... 2.60c.
No. 10, f.o.b. Birmingham 2.55c.
No. 10, f.o.b. cars dock Pacific ports 2.95c.
No. 10 wrought iron, Pgh.... 4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh 3.15c.
No. 24, f.o.b. Gary 3.25c.
No. 24, del'd Detroit 3.35c.
No. 24, del'd Philadelphia 3.44c.
No. 24, f.o.b. Granite City 3.35c.
No. 24, f.o.b. Birmingham 3.30c.
No. 24, f.o.b. cars dock Pacific ports 3.80c.
No. 24 wrought iron, Pitts-burgh 5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh.. 3.10c.
No. 10 gage, f.o.b. Gary 3.20c.
No. 10 gage, f.o.b. Detroit 3.30c.
No. 10 gage, del'd Philadelphia. 3.39c.
No. 10, f.o.b. Granite City..... 3.30c.
No. 10 gage, f.o.b. Birmingham. 3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports 3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh.. 3.55c.
No. 20 gage, f.o.b. Gary 3.65c.
No. 20 gage, del'd Detroit 3.75c.
No. 20 gage, del'd Philadelphia. 3.84c.
No. 20, f.o.b. Granite City..... 3.75c.
No. 20 gage, f.o.b. Birminham. 3.70c.
No. 20 gage, f.o.b. cars, dock, Pacific ports 4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh.. 3.80c.
No. 24, f.o.b. Gary 3.90c.
No. 24, del'd Philadelphia 4.09c.
No. 24, f.o.b. Granite City..... 4.00c.

No. 24, f.o.b. Birmingham 3.95c.
No. 24, f.o.b. cars, dock, Pacific ports 4.40c.
No. 24, wrought iron, Pitts-burgh 6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.
Field grade 3.35c.
Armature 3.70c.
Electrical 4.20c.
Special Motor 5.10c.
Special Dynamo 5.80c.
Transformer 6.30c.
Transformer Special 7.30c.
Transformer Extra Special 7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.
Silicon Strip in coils—Sheet price plus add-on sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh 4.10c.
F.o.b. Gary 4.20c.
F.o.b. cars, dock, Pacific ports 4.80c.

Vitreous Enamelling Stock

No. 20, f.o.b. Pittsburgh 3.50c.
No. 20, f.o.b. Gary 3.60c.
No. 20, f.o.b. Granite City..... 3.70c.
No. 20, f.o.b. cars dock Pacific ports 4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb. 3.30c.
No. 28, Gary 3.40c.
No. 28, f.o.b. Granite City.... 3.50c.
No. 28, cars dock Pacific ports, boxed 4.175c.

Tin Plate

Base per Box
Standard cokes, f.o.b. Pitts-burgh district mill\$5.35
Standard cokes, f.o.b. Gary... 5.45
Standard coke, f.o.b. Granite City 5.55

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

Per Base Box
F.o.b. Pittsburgh\$4.65
F.o.b. Gary 4.75
F.o.b. Granite City 4.85

* Customary 7 1/2 per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)
8-lb. coating I.C.\$11.00
15-lb. coating I.C. 13.00
20-lb. coating I.C. 14.00
25-lb. coating I.C. 15.00
30-lb. coating I.C. 16.25
40-lb. coating I.C. 18.50

Hot-Rolled Hoops, Bands, Strip and Flats under 1/4 in.

Base per Lb
All widths up to 24 in., Pitts-burgh 2.40c.
All widths up to 24 in., Chicago 2.50c.
All widths up to 24 in., del'd Detroit 2.60c.
All widths up to 24 in., Granite City 2.60c.
All widths up to 24 in., Birmingham 2.55c.
Cooperage stock, Pittsburgh... 2.50c.
Cooperage stock, Chicago 2.60c.

Cold-Rolled Strip*

Base per Lb.
F.o.b. Pittsburgh 3.20c.
F.o.b. Cleveland 3.20c.
Del'd Chicago 3.48c.
F.o.b. Worcester 3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

Pittsburgh and Cleveland Worcester
Carbon 0.25-0.50% 3.20c. 3.40c.
Carbon .51-.75 4.45c. 4.65c.
Carbon .76-1.00 6.30c. 6.50c.
Carbon Over 1.00 8.50c. 8.70c.

Fender Stock

No. 14, Pitts'b'gh or Cleveland 3.45c.
No. 20, Pitts'b'gh or Cleveland. 3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

Bright wire 2.90c.
Spring wire 3.50c.
Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

Standard wire nails \$2.75
Smooth coated nails \$2.75
Cut nails, carloads \$3.60

Base per 100 Lb.

Annealed fence wire \$3.20
Galvanized fence wire 3.60
Polished staples 3.45
Galvanized staples 3.70
Barbed wire, galvanized 3.40
Twisted barbed wire 3.40
Woven wire fence, base column... 74
Single loop bale ties, base col... 63

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh, except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.
On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel		Wrought Iron	
In.	Black Galv.	In.	Black Galv.
1/2	52 31	1/2	27 10 1/2
3/4	55 38 1/2	3/4	32 16
1	59 49	1	35 21
1 1/4	62 53	1 1/4	39 23 1/2
1 to 3	64 55	1 1/2	38 23

Lap Weld

2	57 47 1/2	2	32 1/2 18
2 1/2	60 50 1/2	2 1/2 to 3 1/2	33 1/2 20 1/2
3 1/2 to 6	62 52 1/2	4 to 8	35 1/2 24
7 & 8	61 50 1/2	9 to 12	28 1/2 15
9 & 10	60 50		
11 & 12	59 49		

Butt Weld, extra strong, plain ends
1/4 50 1/2 36 1/2
1/2 52 1/2 40 1/2
3/4 57 1/2 48 1/2
1 61 1/2 52 1/2
1 to 3 63 55

Lap Weld, extra strong, plain ends
2 55 46 1/2
2 1/2 & 3 59 50 1/2
3 1/2 to 6 62 54
7 & 8 61 51
9 & 10 60 50
11 & 12 59 49

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G. \$ 9.46	\$ 8.41
1 1/4 in. o.d.	13 B.W.G. 11.21	9.96
1 1/2 in. o.d.	13 B.W.G. 12.38	11.00
1 3/4 in. o.d.	13 B.W.G. 14.09	12.51
2 in. o.d.	13 B.W.G. 15.78	14.02
2 1/4 in. o.d.	13 B.W.G. 17.60	15.63
2 1/2 in. o.d.	13 B.W.G. 19.37	17.21
2 3/4 in. o.d.	12 B.W.G. 21.22	18.85
3 in. o.d.	12 B.W.G. 22.49	19.98
3 1/4 in. o.d.	12 B.W.G. 23.60	20.97
3 1/2 in. o.d.	10 B.W.G. 45.19	40.15
3 3/4 in. o.d.	11 B.W.G. 29.79	26.47
4 in. o.d.	10 B.W.G. 36.96	32.83
5 in. o.d.	9 B.W.G. 56.71	50.38
6 in. o.d.	7 B.W.G. 87.07	77.35

Extra for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft. 5 %
12,000 lb. or ft. to 24,999 lb. or ft. 12 1/2 %
8,000 lb. or ft. to 11,999 lb. or ft. 25 %
2,000 lb. or ft. to 5,999 lb. or ft. 35 %
Under 2,000 lb. or ft. 50 %

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago \$55.00
6-in. and larger, del'd New York 53.00
*6-in. and larger, Birmingham 47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles... 56.00
F.o.b. dock, Seattle 56.00
4-in., f.o.b. dock, San Francisco or Los Angeles 59.00
F.o.b. dock, Seattle 59.00

Class "A" and gas pipe, \$3 extra.
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$41, Birmingham, and \$49.50, delivered Chicago; and 4-in. pipe, \$44, Birmingham, and \$52.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:
1/2 in. x 6 in. and smaller .65 and 5*
Larger and longer up to
1 in.60 and 10*
1 1/2 in. and larger60 and 5*
Lag bolts60 and 10*
Plow bolts, Nos. 1, 2, 3, and 765 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex, blank or tapped:
1/2 in. and smaller65 and 5*
9/16 in. to 1 in. inclusive .60 and 10*
1 1/4 in. and larger60 and 5*

Jobbers discount on above items, 5 per cent.

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:

1/2 in. and smaller60 and 20
9/16 in. to 1 in. inclusive .60 and 15
1 1/4 in. and larger60 and 12 1/2
Stove bolts in packages, nuts attached72 1/2
Stove bolts in packages, with nuts separate72 1/2 and 5
Stove bolts in bulk81 1/2
On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland \$3.60
F.o.b. Chicago or Birmingham... 3.70

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh 70
F.o.b. Cleveland 70
F.o.b. Chicago and Birmingham... 70

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller 75
Milled headless set screws, cut thread 3/4 in. and smaller 75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller 60
Upset set screws, cup and oval points 75
Milled studs 65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base 3.00c.
Delivered, Detroit 3.15c.
S.A.E.

Alloy

Numbers Differential per 100 lb.
2000 (1/4% Nickel) \$0.35
2100 (1 1/4% Nickel) 0.75
2300 (3 1/2% Nickel) 1.55

2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	\$1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum) ..	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum) ..	0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel...	0.15
6100 Chromium-vanadium bar..	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium ...	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel			
	No. 304	No. 302	
Forging billets	21.25c.	20.40c.	
Bars	25c.	24c.	
Plates	29c.	27c.	
Structural shapes..	25c.	24c.	
Sheets	36c.	34c.	
Hot-rolled strip...	23.50c.	21.50c.	
Cold-rolled strip...	30c.	28c.	
Drawn wire	25c.	24c.	

Straight Chrome

No.	No.	No.	No.
410	430	442	446
Bars ..18.50c.	19c.	22.50c.	27.50c.
Plates ..21.50c.	22c.	25.50c.	30.50c.
Sheets ..26.50c.	29c.	32.50c.	36.50c.
Hot strip 17c.	17.50c.	23c.	25c.
Cold stp. 22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

Base Per Lb.

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton f.o.b. United Kingdom Ports

Ferromanganese, ex-port £15
Tin plate, per base box 24s. to 25s.
Steel bars, open-hearth... £9 5s.
Beams, open-hearth... £9 2s. 6d.
Channels, open-hearth... £9 2s. 6d.
Angles, open-hearth... £9 2s. 6d.
Black sheets, No. 24 gage £13
Galvanized sheets, No. 24 gage £16 15s.

CONTINENTAL

Per Metric Ton, Gold £, f.o.b. Continental Ports

Current dollar equivalent is ascertained by multiplying gold pound prices by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£3 7s.
Wire rods, No. 5 B.W.G.	£4 10s.
Steel bars, merchant	£5
Sheet bars	£3 8s.
Plate 1/4 in. and up.....	£6 7s.
Plate 3/16 in. and 5 mm.	£6 13s.
Sheet, 1/4 in.	£7 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£6

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.70c.
Structural shapes	3.70c.
Soft steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$4.48
Spikes, large	1 to 24 kegs 3.90c.
Per Cent Off List	
Track bolts, all sizes, per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	\$4.35
Wire, black, soft ann'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district

**Prices on application.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-finished steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.60c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	4.70c.
Per Cent Off List	
Machine bolts	*60
Carriage bolts	*60
Lag screws	*55 and 5
Hot-pressed nuts, sq. tap or blank	*60
Hot-pressed nuts, hex. tap or blank	*60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd hd tank rivets, 7/16 in. and smaller	55
Wrought washers	\$4.00 off list
Black ann'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	\$4.55
Com. wire nails, 15 kegs or more, per keg	\$3.20
Cement c'd nails, 15 kegs or more, per keg	\$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. char.	
coal	6.50c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.

Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.
Bands	4.32c.
Hot-rolled sheets (No. 10)	4.07c.
Hot-rolled ann'd sheets (No. 24*)	4.82c.
Galvanized sheets (No. 24*)	5.72c.
Long terme sheets (No. 24)	6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ¼ in. and heavier	5.90c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.35c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.11c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	\$3.40

Per Cent Off List

Machine bolts, square head and nut	
All diameters. Prices on application	
Carriage bolts, cut thread:	
All diameters. Prices on application	

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.
†125 lb. and more.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.43c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24)*	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.
Per Cent Off List	
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars—small shapes	
Iron bars (except bands)	3.90c.
†Reinforc. steel bars, sq. twisted and deformed	3.21c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, ¼ in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.86c.

Soft steel bars	3.75c.
†Reinforc. steel bars	2.60c.
†Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'd wire, per 100 lb.	\$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95
Per Cent Off List	
Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count	
½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

†Outside delivery 10c. less.

*For 5000 lb. or less.

‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.95c.
Floor plates	5.85c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Itail steel reforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	\$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	.55 per cent off list
No. 9 ann'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg	
Any quantity less than carload	3.04
Cement c'd nails, base 100-lb keg	3.50
Chain, lin. per 100 lb.	8.35
Net per 100 Ft.	
Seamless steel boiler tubes,	
2-in.	\$21.80
4-in.	\$25.45
Lap-welded steel boiler tubes,	
2-in.	20.73
4-in.	48.41

BUFFALO

	Base per Lb.
Plates	3.92c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	3.97c.
Heavy hot-rolled sheets	\$3.26
Com. wire nails, base per keg	
Black wire, base per 100 lb. (2500-lb. lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON

	Base per Lb.
Channels, angles	4.20c.
Tees and zeos, under 3"	4.45c.
H beams and shapes	4.07c.
Plates—Sheared, tank, and univ. mill, ¼ in. thick and heavier	4.08c.
Floor plates, diamond pattern	6.03c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

Soft steel bars	3.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets	
(No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.
Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.	

* Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

Base per Lb.

Plates and structural shapes	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	4.71c.
Boiler rivets, cone head (keg lots)	4.81c.
Track spikes (keg lots)	4.26c.
Track bolts (keg lots)	5.71c.
Black annealed wire (No. 6 to No. 9 incl.)	4.66c.
Com. wire nails and cement coated nails	
1 to 14 kegs	3.31c.

Per Cent Off List

Machine bolts and carriage bolts, 1/2x6 and smaller	65-10
Larger	65
Coach and lag screws	65
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	65

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

Base per Lb.

Mild steel bars and small shapes	3.85c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.11c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.80c.
Bands	3.85c.
Hoops	4.10c.
Special threading steel	3.95c.
Checkered floor plates 1/4 in. and heavier	5.90c.
Galvanized bars, bands and small shapes	6.35c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	\$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb. All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

Base per Lb.

Mild steel bars	3.96c.
Iron bars	3.96c.
Reinforcing bars	3.96c.
Structural shapes	4.01c.
Plates	4.01c.
Hot-rolled sheets No. 10	3.91c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.16c.
Cold-finished bars	4.86c.

* Plus mill item extra.

MEMPHIS

Base per Lb.

Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	4.35c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	60

NEW ORLEANS

Base per Lb.

Mild steel bars	4.20c.
Reinforcing bars	3.14c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.10c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	\$3.30
Bolts and nuts, per cent off list	65

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports	2.975c.	2.975c.	3.625c.
Hot-rolled annealed sheets (No. 24)	5.15	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel			
Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	\$3.65	\$3.60	\$3.70

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00
5 per cent trade discount on fire clay brick.	

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50
5 per cent trade discount on silica brick.	

Chrome Brick

Per Net Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

Per Net Ton

Standard f.o.b. Baltimore and Chester, Pa.	\$69.00
Chemically bonded, f.o.b. Baltimore	59.00

Grain Magnesite

Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash.	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	21.00
Delivered San Francisco, Los Angeles or Seattle	25.00
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	\$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.50
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. \$28.50

Gray Forge

Valley or Pittsburgh furnace... \$23.50

Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75....	\$26.50
No. 2 fdy., sil. 1.75 to 2.25....	25.50
Malleable	26.00
Basic	25.50
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75....	\$27.50
No. 2 fdy., sil. 1.75 to 2.25....	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Per Gross Ton	
Domestic, 80% (carload)	\$95.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$30.00
F.o.b. New Orleans	30.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 6.00 to 6.50%	\$28.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton	
10.00 to 10.50%	\$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads....	\$1.35
Ferrotungsten, lots of 5000 lb.	1.40
Ferrotungsten, smaller lots	1.45
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.
Ferrochromium, 2% carbon	16.50 to 17.00c.
Ferrochromium, 1% carbon	17.50 to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovandium, del. per lb. contained V.	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with 3% unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with 3% unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$45.00
Ton lots or less, per ton....	50.00
Silico-manganese, gross ton, delivered.	
3%	95.00
2.50% carbon grade	100.00
2% carbon grade	105.00
1% carbon grade	115.00

Note: Spot prices are \$5 a ton higher except on 75 per cent ferrosilicon on which premium is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50% ...	\$5.25
Old range, non-Bessemer, 51.50% 5.10	
Mesabi, Bessemer, 51.50%	5.10

Mesabi, non-Bessemer, 51.50% ..	\$4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% dry, Algeria	13.50c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	10.00c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	34c.
Man., African, Indian, 44-48%	25c. to 30c.
Man., African, Indian, 49-51%	30c.
Man., Brazilian, 46 to 48½%	Nominal. 25c. to 30c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	\$18.00 to \$18.50
Tungsten, domestic, scheelite delivered, nominal	\$18.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per net ton:	
South African	\$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	25.00
Turkish, 48-49%	24.50 to \$25.00
Turkish, 45-46%	20.50 to 21.00
Turkish, 44%	19.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
52%	\$25.50 to \$26.00
50%	24.50
48-49%	24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$19.00 to \$20.00
Domestic, barge and rail	\$19.50 to 21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	\$20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid....	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial 4.35c.	
Del'd Ch'go, No. 5 industrial 3.90c.	
Del'd Cleve'd, No. 3 distillate. 6.00c.	
Del'd Cleve'd No. 4 industrial 5.75c.	
Del'd Cleve'd No. 5 industrial 5.00c.	

COKE AND COAL

Coke Per Net Ton

Furnace, f.o.b. Connells-ville, Prompt	\$4.60 to \$4.75
Foundry, f.o.b. Connells-ville, Prompt	5.00 to 6.25
Foundry, by - product, Chicago ovens	10.25
Foundry, by - product, del'd New England ...	12.50
Foundry, by - product, del'd Newark or Jersey City	9.60 to 10.05
Foundry, by - product, Philadelphia	9.85
Foundry, by - product, delivered Cleveland ...	11.00
Foundry, by - product, delivered Cincinnati ..	10.50
Foundry, Birmingham ..	6.50
Foundry, by - product, St. Louis, f.o.b. ovens.	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines....	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¼-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45



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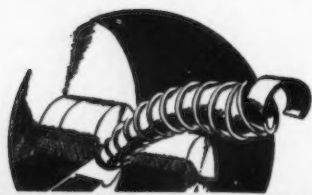
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THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

... General Motors buying equipment for truck diesel engine plant.

o o o

... Railroad buying is feature of business at Chicago.

o o o

... Business continues in fair volume despite price rises and long deliveries.

Cleveland

ORDERS and inquiries for single machines show a slight improvement in this territory in which business has been slow recently. Inquiries at present usually result in the rather prompt placing of orders. Business with some machine tool builders has fallen off but this is not causing anxiety, because they have so many orders booked. Horizontal boring mills have quieted down but a local manufacturer has enough business to keep its plant at full operations for over five months. Cold heading machines and forging presses are moving well. General improvement in machine tool sales is expected to follow the settlement of the automobile strikes. The New York Central Railroad has started to place orders in New York for considerable equipment for its Collinwood shops in Cleveland for which an inquiry was sent out about 60 days ago.

Detroit

PRODUCTION plans are well set now for the new General Motors truck diesel engine which will be built at Redford. Purchase of machinery and tools for this diesel is the most important activity in Detroit at present. Several engines, possibly 3, 4 and 6 cylinders, will be built. Chrysler, anxious to match General Motors in the diesel field, is at work on a six which should be revealed soon. Increased production of Buick and Pontiac cars next year will result from purchasing being done now. Twenty to 25 per cent increase is planned in each case. For Buick this is a step back from the original plan to double production on its "40" line.

The Buffalo plant of Chevrolet for the manufacture of engines and axles still is requiring plenty of attention from machinery salesmen and some have quoted on several kinds of set-ups for the plant. Despite the fact that the plant will not operate until January, 1938, many deliveries are being arranged for very early fall.

Pittsburgh

ORDERS slipped off a little in the past week. Aggregate business, however, constitutes a satisfactory volume. Many customers are digesting recent inquiry data which may be responsible for the slight lull. Inquiries, on the other hand, show no tendency to decline. Customers are being pushed so much for their products that old machines are not standing the pace. Consequently there is considerable thought being given to more modern set-ups. The type of business coming in at this time consists of requests for machinery that is urgently needed regardless of the cost. As pointed out in the past, higher labor costs will serve as a constant impetus for machine tool sales. Meanwhile deliveries are far from what customers would like.

Chicago

RAILROAD purchases are exceptionally promising. The Union Pacific and the Burlington will start this month on long lists. The Chicago & North Western finds money tight, but will purchase part of its list, and the Santa Fe has found new needs and is adding to its requirements. The used machinery market is so thoroughly cleaned out that tools are moving

which were considered to be only one step away from the scrap pile.

Cincinnati

TEMPO of the district machinery market increased the past week, with the addition of several automotive orders to the already active demand. Two builders of lower priced cars placed multiple unit orders for millers, grinders and broaching machinery, the exact quantity being undisclosed. Other automobile companies were in the market for lathes. The demand, however, remains broad and analysis of buying reflects interest from virtually all users for widely varying types of tools. Heavy tools are in steady demand, contributing a firm undertone to current business. Deliveries are extended, although plants are working at high level to accommodate promised shipments. Skilled labor is still scarce.

New York

PRICE advances have become general over the past week, ranging from 10 to 15 per cent and constitute a secondary advance for some builders since the general increase prior to the first of the year. Some are still not making advances to take effect immediately, but, as was mentioned last week, are quoting price at time of shipment on tools requiring over three months for delivery, subject to a limitation of from 10 to 15 per cent over present levels. Demand continues good and deliveries continue to grow worse, six to 10 months not being at all unusual. The New York Central has issued another inquiry, comprising six items. Major purchasers in this district are buying steadily and responsible officials from two of the largest machine tool customers' plants have predicted that business will continue at near current levels for at least two more years.

Blaw-Knox Acquires Power Piping Co.

THE Blaw-Knox Co., Blawnox, Pa., has acquired the property and business of the Power Piping Co. of Pittsburgh, W. P. Withrow, president of the Blaw-Knox Co. has announced.

The Power Piping Co. was organized in 1916, and has been engaged in the design, manufacture, and erection of piping for power plants, oil refineries, sewage plants, water works and industrial plant usages for all pressures and purposes. In 1934, it added a sprinkler division, and the company has been a material factor in this industry since that time.

The business will now be operated under the name of Power Piping Corp. William V. Quartz will continue in charge.



PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Anaconda Wire & Cable Co., 25 Broadway, New York, has let general contract to David Eshelman & Son, 518 West Fifth Street, Anderson, Ind., for one-story addition to branch plant at Anderson, 80 x 190 ft. Cost over \$65,000 with equipment.

K-W Battery Co., 1532 South Michigan Avenue, Chicago, manufacturer of heavy-duty electric storage batteries, has leased Building 57 at New York Dock Co. terminal, Joralemon and Furman Streets, Brooklyn, about 15,000 sq. ft. floor space, for new Eastern factory branch, storage and distributing plant.

Union Bag & Paper Corp., Woolworth Building, New York, has plans for new two-story paper-converting plant at Vernon, Los Angeles, about 80,000 sq. ft. floor space, for production of kraft, glassine, cellophane and other paper bags and containers. Cost over \$300,000 with machinery.

Pan-American Airways System, 135 East Forty-second Street, New York, is remodeling and improving property on Manhasset Bay, Port Washington, L. I., acquired a few years ago from American Aeronautical Corp., and now to be developed as an operating base for over-ocean air liners to Bermuda and other points. Hangar, 130 x 350 ft., will be improved and one-story skeleton steel structure at rear of hangar will be inclosed for a machine shop.

National Container Corp., Long Island City, N. Y., manufacturer of corrugated shipping boxes and containers, has let general contract to Merritt-Chapman & Scott Corp., 17 Battery Place, New York, for new kraft pulp and paperboard mill at Jacksonville, Fla., where site recently was secured. It will include power house, machine shop and other mechanical structures. Company has arranged financing through sale of bonds and stock to total over \$3,000,000 and will use entire fund for project.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until April 19 for 230,000 ft. of wire (Circular 145); until April 20, 100 to 200 cabinet racks for army airways control towers (Circular 151); until April 23, one 100-kw. power unit, gasoline engine-driven (Circular 157); until April 27, capacitors, coils, relays, transformers, insulators, dial assemblies and other equipment (Circular 153).

Simmons Machine Tool Corp., Albany, N. Y., has approved plans for one-story and basement addition, 80 x 290 ft., and will carry out erection by day labor. Cost over \$65,000 with equipment.

Superintendent of Lighthouses, St. George, Staten Island, New York, asks bids until April 20 for 200 or more automatic flashing mechanisms for controlling light and eclipse periods on beacon lights (Proposal 53518).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 20 for marine use cable for Brooklyn Navy Yard (Schedule 405); electric cable for Brooklyn and Philadelphia yards (Schedule 428); until April 27, 167 power-driven fuel pumps for Paterson, N. J., and Philadelphia (Schedule 445).

Fred W. Sauer Mfg. Co., 220 Seventeenth Street, West New York, N. J., manufacturer of stamped metal products, has leased a floor in building at 7 Oliver Street, Newark, N. J., for plant, removing present works to new location and increasing capacity.

Board of Essex County Freeholders, Court House, Newark, plans new steam-electric power plant at institution at Soho, N. J., installation to include electric generating unit and accessories, boilers and auxiliary

equipment. Cost close to \$175,000. **Eppler & Kahrs**, 17 Washington Street, are architects; **Runyon & Carey**, 31 Fulton Street, are consulting engineers, both Newark.

Art Tube Co., 8 Renee Place, Irvington, N. J., manufacturer of collapsible metal tubing, etc., has let general contract to Damon G. Douglas Co., 605 Broad Street, Newark, for one-story and basement plant, 145 x 150 ft. Cost close to \$100,000 with equipment. **John T. Simpson**, 744 Broad Street, Newark, is architect.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until April 20 for one motor-driven, precision, bench-type milling machine (Circular 575); steel drop forgings (Circular 577); until April 22, one caliber 0.59 case tapering machine (Circular 548); until April 26, horizontal, belt driven shell-turning machine (Circular 535).

◀ BUFFALO DISTRICT ▶

Doehler Die Casting Co., Batavia, N. Y., has let general contract to J. E. Flierl Construction Co., 106 Kingsley Street, Buffalo, for one-story addition, primarily for production of magnesium die castings. Cost over \$150,000 with equipment.

Loudon Packing Co., Terre Haute, Ind., canner and packer of food products, has approved plans for new branch plant on seven-acre tract at Lockport, N. Y., recently acquired, comprising main one-story unit, 100 x 400 ft., with two-story building adjoining, 50 x 90 ft., boiler house and other structures. Cost close to \$135,000 with equipment. **Thomas C. Hayes** is vice-president in charge. Company is affiliated with American Packing Corp., Evansville, Ind.

◀ SOUTH ATLANTIC ▶

Albemarle Paper Mfg. Co., Richmond, Va., has arranged for purchase of mill of Halifax Paper Co., Inc., Roanoke Rapids, N. C., specializing in production of kraft paper stocks, and will operate as branch plant. Extensions and improvements will be made, including new machinery in sulphate pulp mill. Later it is proposed to install additional paper-making machinery and auxiliary equipment in finished stock division. Cost over \$100,000 with machinery.

Statesboro Provision Co., Statesboro, Ga., meat packer, has let general contract to Walter Aldred, Jr., Statesboro, for one-story branch plant at Portal, Ga., 45 x 60 ft. Cost about \$30,000 with equipment.

◀ WASHINGTON DIST. ▶

Bureau of Yards and Docks, Navy Department, Washington, asks bids until April 21 for dust-collecting system for shop building at Naval Torpedo Station, Goat Island, Newport, R. I. (Specifications 8430).

Board of District Commissioners, District Building, Washington, asks bids until April 26 for one 5'0,000-gal. elevated steel water tank, including erection at Alabama and Naylor Roads.

United Distillers of America, Ltd., 2700 Wilmarco Avenue, Baltimore, has let general contract to Jerome J. Gebhart, 3408 Calloway Avenue, for remodeling one-story plant unit, 46 x 142 ft., for expansion. Cost over \$40,000 with equipment. **Benjamin Frank**, 15 West Lexington Street, is architect.

General Purchasing Officer, Panama Canal, Washington, asks bids until April 22 for machine screw nuts, chain bolts, galvanized awning pulleys, brass terminal tubes, fuse clip terminals, brass escutcheon pins, brass plate washers, casement fasteners and other equipment (Schedule 3242).

Reid-Avery Co., 6 Dunmanway, Baltimore, manufacturer of welding rods, wire products and allied specialties, has let general contract to W. E. Bickerton Construction Co., 515 Cathedral Street, for one-story addition, 100 x 120 ft. Cost over \$60,000 with equipment. **Carson & Carson**, Commercial Trust Building, Philadelphia, are architects and engineers.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 20 for brass, bronze, copper, lead and steel wire (Schedule 349); vacuum pumps for aircraft engines (Schedule 364); bare resistance wire (Schedule 341); until April 23, gages for welds (Schedule 381); cart-ridge type aircraft starters (Schedule 376); until April 27, electric cable (Schedule 390); storage batteries and spare parts (Schedule 378) for Eastern and Western yards; until April 23, parts for single cylinder compression ignition aircraft engines for Langley Field Naval Air Station, Va. (Schedule 900-746).

◀ NEW ENGLAND ▶

Commanding Officer, Ordnance Department, Springfield Arsenal, Springfield, Mass., asks bids until April 30 for one automatic, double-end milling and centering machine (Circular 200), one motor-driven woodworking jointer, with four-post automatic endless chain conveyor feeder (Circular 198), one motor-driven, hand portable sanding machine (Circular 199).

Eastern States Farmers' Exchange, Inc., 666 Summer Street, Boston, has let general contract to M. Spinelli & Son, 38 Chauncy Street, for two-story and basement plant, 238 x 390 ft., at Cambridge, Mass., for manufacture of fertilizers. Cost close to \$500,000 with equipment. **A. E. Baxter Engineering Co.**, 344 Delaware Avenue, Buffalo, is consulting engineer.

Empire Oil Co., 26 Francis Avenue, Hartford, Conn., has plans for new bulk oil storage and distributing plant at East Hartford, with pumping plant, tanks, etc. Cost over \$65,000 with equipment. **Joseph E. Kane**, Hartford, is architect.

Waterbury Rolling Mills, Waterbury, Conn., has let general contract to Torrington Building Co., Torrington, Conn., for one-story addition, 80 x 86 ft. Cost close to \$50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 23 for winding coils for Newport, R. I. Navy Yard (Schedule 391).

General Radio Co., 30 State Street, Cambridge, Mass., has let general contract to Lawson W. Oakes, Inc., 100 Halleck Street, Boston, for one-story and basement addition, 75 x 95 ft. Cost close to \$50,000 with equipment.

Wire Rope Corp. of America, 464 Congress Avenue, New Haven, Conn., has plans for one and two-story addition, 150 x 150 ft. **Leo F. Caproni**, 1221 Chapel Street, is architect and engineer.

◀ SOUTH CENTRAL ▶

Continental Gin Co., 212 Poplar Street, Memphis, Tenn., manufacturer of cotton-ginning machinery and parts, has let general contract to Memphis Construction Co., 1400 Riverside Boulevard, Memphis, for two-story addition, 90 x 148 ft., in part for storage and distribution. Cost about \$75,000 with equipment. **E. L. Harrison**, Fidelity Bank Building, is architect.

State Department of Prisons, Frankfort, Ky., plans several shop buildings, power house and other mechanical structures at new State prison farm at LaGrange, Ky., where tract has been secured, to replace State reformatory at Frankfort. Entire project will cost about \$1,850,000. Financing has been arranged through Federal aid.

Roane Sugars, Inc., Loisel Street, New Iberia, La., has approved plans for expansion and improvements at cane sugar mill, including additional equipment. Cost over \$75,000 with equipment.

Continental Oil Co., Philtower Building, Tulsa, Okla., has begun work on new natural gasoline plant at Lake Charles, La., with steel tank storage department. Cost over \$100,000 with equipment.

◀ WESTERN PA. DIST. ▶

Westinghouse Electric & Mfg. Co., East Pittsburgh, has approved plans for one-story addition to branch plant at Emeryville, Cal., 200 x 400 ft. A 5 and 10-ton traveling crane will be installed. Company has begun erec-

tion of another one-story addition to same plant, primarily for assembling department. Entire project will cost over \$400,000 with equipment. P. J. Walker Co., Sharon Building, San Francisco, will be in charge of erection.

United States Engineer Office, New Post Office Building, Pittsburgh, asks bids until April 28 for two locomotive type cranes for Emsworth lock and dam (Circular 349).

Somerset Packing Co., Somerset, Pa., packer of food products, has plans for new one-story packing and canning plant, 60 x 125 ft., with several smaller one-story units for storage and distribution. Cost about \$60,000 with equipment.

◀ OHIO AND INDIANA ▶

Perry-Fay Mfg. Co., Perry Court, Elyria, Ohio, manufacturer of screw machine products, has let general contract to T. J. Hume, 435 Hamilton Avenue, Lorain, Ohio, for one-story addition, 50 x 200 ft. Cost over \$65,000 with equipment. Silabee & Smith, Turner Building, are architects. R. D. Perry is general manager.

Inland Mfg. Division of General Motors Corp., Dayton, Ohio, manufacturer of steering wheels, running boards and other automobile equipment, radio equipment and parts, etc., has approved plans for one-story addition, to occupy about a city block square. Cost about \$750,000 with equipment.

Standard Register Co., Campbell Street, Dayton, Ohio, manufacturer of continuous roll printing registers and kindred products, has let general contract to Austin Co., Cleveland, for one and two-story addition, 150 x 180 ft. Cost about \$225,000 with equipment.

Central Ohio Light & Power Co., Findlay, Ohio, plans new steam-operated electric generating plant at Bluffton, Ohio, for which bids will be asked soon. Cost \$1,200,000 with equipment. Company has secured permission to arrange financing in such amount, entire fund to be used for purpose noted.

Eilert Brewing Co., Sackett Avenue and West Thirty-second Street, Cleveland, has let general contract to Boldt-Rapp Co., 2175 Ashland Road, for three-story addition, 40 x 65 ft. Cost over \$60,000 with equipment. J. H. Graham, Hanna Building, is architect.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until April 23 for 20 motor-driven combination pedestal type grinders and buffers, four buffers and polishers, and seven two-wheel pedestal type grinders (Circular 641).

Cliffside Brewing Co., 242 McMicken Avenue, Cincinnati, has let general contract to Fisher-DeVore Construction Co., 3629 Idlewild Avenue, for three-story, mechanical-bottling unit, 96 x 120 ft. Cost over \$100,000 with equipment. Richard Griesser & Son, 64 West Randolph Street, Chicago, are architects.

Pierce Governor Co., Ohio Avenue, Anderson, Ind., manufacturer of engine governors and kindred equipment, has let general contract to David Eshelman & Son, 518 West Fifth Street, for two-story addition, 77 x 145 ft. Cost over \$50,000 with equipment. E. R. Watkins, Anderson Bank Building, is architect.

Socony Vacuum Oil Co., 518 North Delaware Street, Indianapolis, has let general contract to Ray T. Fatout, 3660 Watson Road, for one-story bulk storage and distribution building. Cost about \$35,000 with equipment.

◀ MICHIGAN DISTRICT ▶

Ford Motor Co., Dearborn, Mich., has awarded structural steel contract to Whitehead & Kales Co., Detroit, for one-story plant unit at River Rouge, totaling about 450,000 sq. ft. floor space, for production of automobile tires and tubes. Cost about \$3,500,000, of which approximately \$2,000,000 will be expended for equipment; of this amount, award for rubber-making machinery has been let to National Rubber Machinery Co., Akron, Ohio, totaling close to \$1,000,000. Contracts for other equipment will be placed soon. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

LeMaire Tool & Mfg. Co., South Telegraph Road, Dearborn, Mich., will begin superstructure at once for one-story addition, 84 x 90 ft. Cost over \$50,000 with equipment.

Quartermaster, Air Base, Selfridge Field,

Mich., asks bids until April 20 for screw anchors, toggle bolts, pipe bushings, malleable iron caps, screw clamps, fence wire, steel wool, stokers, bronze screen wire cloth, metallic conduit, connectors, elbows, gaskets, steel outlet boxes and other equipment (Proposal 828-22).

Vento Steel Products Co., Inc., Muskegon, Mich., manufacturer of steel sash and kindred specialties, has let general contract to Muskegon Construction Co., Muskegon, for one-story addition. Cost about \$45,000 with equipment.

Goebel Brewing Co., 2001 Rivard Street, Detroit, has plans for two-story addition, 80 x 100 ft., primarily for storage and distribution. Cost over \$60,000 with equipment. Harley & Ellington, Inc., Stroh Building, is architect and engineer.

◀ SOUTHWEST ▶

Benjamin Moore & Co., 1630 South Second Street, St. Louis, manufacturer of paints, varnishes, oils, etc., has plans for one and two-story and basement addition, 61 x 70 ft. Cost about \$40,000 with equipment. Mauran, Russell & Crowell, Chemical Building, are architects.

Board of Education, 410 South Cincinnati Street, Tulsa, Okla., plans manual training department in new multi-story Will Rogers high school, for which bids will be asked soon on general contract. Cost about \$1,000,000. A. M. Atkinson, Thompson Building, is supervising architect; Leon B. Senter, Philworth Building, and J. R. Koberling, 569 South Peoria Street, are associate architects.

Common Council, Canton, Kan., plans new municipal artificial gas plant and system. Cost over \$65,000. Bond issue has been approved for \$30,000, remainder of fund to be secured through other financing. Hefling & Hughes, West Second Street, Hutchinson, Kan., are consulting engineers.

High Grade Packing Co., Galveston-Houston Highway, Houston, Tex., meat packer, has plans for extensions and improvements, including equipment. Boiler plant will be improved with new 225-hp. boiler unit and accessories. Cost over \$45,000 with equipment.

Standco Oil Tools Co., 1206 Rothwell Street, Houston, Tex., has acquired building at Hill Street and Clinton Drive, and will remodel for expansion. New unit will be used largely for production of bolts, studs and kindred products. Company is arranging early change of name to Standco Bolt Co.

◀ MIDDLE WEST ▶

Cameron Can Machinery Co., 240 North Ashland Avenue, Chicago, has let general contract to H. F. Friestedt Co., 520 North Michigan Avenue, for one-story addition. Cost about \$70,000 with equipment. Thiellbar & Fugard, 520 North Michigan Avenue, are architects.

Luthile Pump Co., 925 East Ninety-fifth Street, Chicago, manufacturer of pumping machinery and parts, has let general contract to A. S. Low, 510 North Dearborn Street, for one-story addition, 83 x 110 ft., primarily for storage and distribution. Cost over \$40,000 with equipment. W. H. Farnum, 510 North Dearborn Street, is architect.

Quartermaster, Scott Field, Ill., asks bids until April 19 for one portable belt conveyor (Proposal 824-47).

Bay Petroleum Co., Denver, has plans for new gasoline combination topping and cracking plant near city limits, comprising several one and multi-story units. A large steel tank storage and distributing division will be built. Entire project will cost about \$375,000 with equipment. Company recently removed its headquarters from Sidney, Neb., to Denver.

Acme Steel Co., 2840 South Archer Avenue, Chicago, has asked bids on general contract for additions to plant at Riverdale, including one-story extension to machine shop, 85 x 300 ft., with one-story side wing, 100 x 200 ft.; a one-story addition, 70 x 140 ft., to another existing unit, and a four-story addition, 95 x 810 ft., of which a considerable part will be used for storage and distribution, and remainder for general operating service. Entire project will cost close to \$1,000,000 with equipment. F. S. Hynes is company engineer in charge.

Deere & Co., East Moline, Ill., manufacturer of agricultural implements and machinery, has let general contract to J. H. Hunzinger Co., Security Building, Davenport, Iowa, for one-story and basement addition, 180 x 440 ft., in part for storage

and distribution. Cost about \$175,000 with equipment.

Harnischfeger Corp., Milwaukee, is reconditioning and re-equipping its Hercules plant on Robinson Avenue for occupancy by its recently organized welding rod department, to provide additional manufacturing space in main works in West Milwaukee. J. C. Joubanc is engineering and production manager, and J. P. Morrissey, sales manager.

Four-Wheel Drive Auto Co., Clintonville, Wis., with branch factory at Kitchener, Ont., is installing new heat-treating department as main works and purchasing new gear-cutting machinery, lathes and other equipment costing \$100,000 in both plants. Improvements are to be completed by June 1.

Fulton Co., 1912 South Eighty-second Street, West Allis, Milwaukee, is increasing its common stock from 100,000 shares to 300,000 shares and its preferred stock from 50,000 shares to 100,000 shares. Improvements for materially increasing production of automotive accessories, parts and equipment are in immediate prospect.

◀ PACIFIC COAST ▶

Army Air Corps Supply Depot, North Sacramento, Cal., has let general contract to MacDonald & Kahn Co., Ltd., Financial Center Building, San Francisco, for new engineering shops and repair dock, totaling 600 x 880 ft. Contract price \$1,583,251, exclusive of shop equipment.

American Can Co., 111 Sutter Street, San Francisco, has let general contract to Barrett & Hilp, 918 Harrison Street, for one-story addition to local forge and blacksmith shop. Cost about \$30,000 with equipment.

Solar Aircraft Co., San Diego, Cal., manufacturer of airplanes and parts, aircraft engines, etc., has arranged financing through sale of capital stock to total \$225,000, part of proceeds to be used for plant additions and equipment.

Quartermaster, Vancouver Barracks, Vancouver, Wash., asks bids until April 30 for one heavy-duty logging type hoist and one fair-lead (Proposal 932-47).

Cudahy Packing Co., 803 Macy Street, Los Angeles, meat packer, has asked bids on general contract for four-story addition and improvements in present units. Cost over \$200,000 with equipment. Main offices are at Chicago.

United States Engineer Office, Second District, Pittcock Block, Portland, asks bids until April 20 for 80,000 ft. of control cable (Circular 327).

Howe Sound Co., Lucerne, Wash., plans new milling plant at local copper mining properties, consisting of several one and multi-story units. It is proposed to establish a new mining village near properties. Entire project will cost over \$500,000 with equipment. Main offices of company are at 730 Fifth Avenue, New York.

Commanding Officer, Ogden Ordnance Depot, Ogden, Utah, asks bids until May 5 for one 150-gal. mixing and melting kettle, one rotary cutter, two steam-jacketed mixers, and one steam-jacketed cock (Circular 2).

◀ FOREIGN ▶

Leyland Motors, Ltd., Leyland, Lancashire, England, manufacturer of automobile engines and parts, has plans for one-story addition for machine shop and for engine assembling division, doubling present capacity of these departments. Cost over \$100,000 with equipment.

Paringa-Mingin Exploration Co., Ltd., 87 Bishopsgate, London, E. C., has plans for ore-treating plant, comprising units for smelting and refining, storage and distribution, with power house and other mechanical structures. Cost over \$1,000,000 with machinery.

North American Cyanamid, Ltd., Niagara Falls, Ont., has approved plans for one-story addition, 160 x 300 ft. Cost over \$160,000 with equipment.

Norma-Hoffmann Bearings Corp., Stamford, Conn., has moved Pittsburgh offices to Room 722 Gulf Building. A. A. Van Pelt continues in charge.

Frank Samuel & Co., Inc., dealer in iron, chrome and manganese ores, has removed its New York office to 40 Exchange Place. H. P. Banks is manager.

Characteristics of Industrial Drive Motors

(CONTINUED FROM PAGE 45)

of wound rotor induction motors may be provided with capacitors, or condensers connected in series with a special winding to increase the power factor. The Noel motor of this type was illustrated and described in the Jan. 14 issue of THE IRON AGE.

General Purpose and Special Service

Many motor manufacturers group motors in two categories: General purpose and special service. Definitions of these two categories, applying particularly to the quick-reference tables included in this paper, can be stated in these terms:

General purpose motors are those industrial motors which are not specifically designed for some special power application. In sizes they are confined to motors of 200 hp. or less and 450 r.p.m. per minute or more, having a continuous-time rating on a temperature rise basis of 40 deg. By far the majority of industrial requirements are met by standard, general purpose, constant speed motors.

Special service motors are all those which cannot be classed as general purpose motors. Standard types of special service motors are grouped as such in the table herewith. In addition the special types of motors described above are included in this category.

General purpose constant speed open motors are rated on the basis of a rise in temperature on continuous duty of not more than 40 deg. C. If the motor is semi-inclosed the rating may be reduced, or the open rating held on a 50 deg. C. rise. Totally inclosed general purpose motors are usually rated on a 55 deg. C. rise, but inclosed mill-type, crane-type and railway-type motors have a 75 deg. C. rise allowed, applying to continuous or short-time duty as stated on the motor. Forced ventilation inclosed motors, however, may be rated on the open motor basis.

Mechanical Characteristics

The third broad method of motor classification is by mechanical features or characteristics. The "standard" motor is a horizontal, open frame, short shaft, ball, roller or sleeve-bearing equipped type, arranged for coupling or pulley mounting on the back end of the motor. A special, long shaft may be used, or the load may be taken from the front end of the motor at reduced ratings.

The motor may be mounted vertically, with lower end shield, with a ring base, with a tripod base or a four-legged base; all for thrust-type or no-thrust-type service.

Horizontal motors may be provided with flange type end-shields for direct mounting on the driven machine, or face type end shields for the same purpose.

A semi-inclosed motor may have either or both ends covered with perforated casings, or may have solid top-half covers on the collector-end.

A drip-proof motor has a total inclosure over the upper half of

the motor to exclude falling moisture or dirt.

A splash-proof motor is totally inclosed to protect the motor from spray coming from any direction.

Gas-tight and dust-tight motors should be totally inclosed with gasketed covers. Explosion-proof motors are likewise totally inclosed with gasketed covers, but much more substantially constructed as to the inclosure features.

Self-ventilated motors are totally inclosed motors equipped with fans and means for air inlet and air exhaust in the casing.

Forced ventilated motors are totally inclosed motors with means of air inlet and air exhaust, but depend upon an outside forced air supply.

All these various mechanical variations of the open type motor are used for special applications where considerations of service require them. They do not, in general, affect the electrical operating characteristics, and may, therefore, be considered apart from them in making a selection of the right motor for any particular drive.

(The next article in this series will take up in detail the determination of size of motor for a particular drive, based on analyses of the elements of load, starting, and other considerations.)

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Fundamental Principles of Metallic Corrosion

(CONTINUED FROM PAGE 48)

measurements of Bengough and Wormwell have indicated that under some conditions the presence of sulphur in iron does not increase the corrosion velocity; if anything it has the reverse effect. In some of the Cambridge researches, carried out under very different conditions, it has been found that the presence of sulphide, either in the metal or in the liquid, increases both the probability that corrosion will set in and the velocity of attack attained. The extensive work conducted jointly by Hoar at Cambridge and Havenhand at Sheffield has shown that sulphide either in the metal or in the liquid greatly enhances the corrosion of steel produced during short periods by acid citrate liquids. Copper in the steel counteracts the bad effect of sulphur. If confirmed in long-time experiments with fruit, this will be a matter of great importance to the fruit canner. In some instances, even a knowledge of the total amount of sulphur in the surface layers may provide insufficient information. The distribution of the sulphur throughout these layers may have a profound influence on the results.

Consider a steel containing a few large sulphide inclusions exposed to conditions under which that sulphur stimulates attack. Then pronounced corrosion will commence at the sites of these inclusions. This will usually produce corresponding cathodic protection to the areas around, so that the attack, concentrated on a few points, will be very intense and dangerous. Another steel with the same amount of sulphur on the surface layers well spread out as a large number of small inclusions will suffer far less intense attack. Thus in choosing steel for conditions where sulphur is known to be dangerous, it is advisable not only to make a quantitative determination of the sulphur in the surface layers, but also to carry out an intelligent qualitative study of sulphur prints.

The extensive marine tests of the Institution of Civil Engineers show that the contrast between the be-

haviour of different ferrous materials is most pronounced when they are exposed to the atmosphere, less marked under conditions of intermittent immersion and least of all under conditions of constant immersion. This is probably because, under conditions of constant immersion, the corrosion rate is to some extent restricted by the limited rate of oxygen supply, which in general will not be influenced by small changes in the composition of the material, whereas under atmospheric conditions there is usually as much oxygen as the materials can take up, and thus the chemical and physical character of the iron has a chance to influence the rate of attack.

Although cases can be adduced where the chemical and physical character of the metal has little influence on the rate of wastage, there are other instances where it has a very serious influence, and it is unlikely that practical corrosion problems will be solved without the efforts of steel manufacturers to deliver their material in a state best capable of resisting the conditions that it will encounter in service. It cannot be said, however, that it is always known with certainty what this state is, nor is it a question that can easily be answered by small-scale research in the ordinary laboratory. However, the Corrosion Committee of the Iron and Steel Institute has in hand an extensive and highly practical program. These large-scale investigations should provide an answer to the many practical questions that in the present have been unanswered. If they should succeed in developing a scheme by which a ship's plate would shed its scale, without expensive treatment or inconvenient procedure, during the normal course of shipbuilding, this would clearly be a matter of great importance in combating corrosion on ships. There appears to be nothing fundamentally impossible about this, although it is only mentioned as one of many practical problems, some of which at least the committee may reasonably hope to solve.

The most obvious method of preventing corrosion is to cover the metal with a coat which will entirely exclude all corrosive substances, including water, salts, oxygen, acid fumes and the like. Many people still imagine that all ordinary paint coats act in this way, but this is not the case. Probably it may be claimed, however, that the glassy enamels and many of the modern baking varnish coats do largely exclude corrosive influences from the metal, although the formation of rust below an apparently continuous coat of enamel is not unknown, and can sometimes be revealed photographically when it is invisible to the naked eye.

Essentially the requirements of a glassy enamel are that it should itself be unaffected by the corrosive agents present, that it should adhere closely, and that it should not chip off under conditions of fluctuating temperatures. This would seem to call for an approximate agreement between the coefficients of expansion of enamel and basic metal, which may be difficult to achieve when the basis is sheet steel, and the enamel is to be one capable of resisting acid, but much may be done by the use of multiple coats, each successive layer having a slightly lower coefficient of expansion and a slightly higher acid resistance than that below it.

The old-fashioned paints based on drying oil which provide the most widely used means of protecting metal, are not to be regarded merely as waterproofing coverings. The ordinary paint film takes up moisture rather as gelatine takes it up, and although this can be diminished by suitable choice of composition, it is not easy, nor is it necessary, to render the paint film, as such, completely waterproof. If the paint contains a constituent, such as red lead, which causes the corrosive reaction to stifle itself in the opening stages, the presence of microscopic pores or fissures in the coat ceases to be so dangerous a matter. Such inhibitive substances should be included in the innermost coat, which is in contact with the metal. The other coats need not contain an inhibitive substance, and should be chosen to be as waterproof as is possible without sacrifice of other properties. For the outer coat mechanical hardness may be very important. Outdoor tests suggest that a red lead coat below followed by two coats of red iron oxide gives

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satisfactory protection in ordinary cases. Doubtless in special situations the protection scheme may have to be modified. Where there is blown dust, or where the painted surfaces are likely to be abraded, the outer coat must be chosen mainly with a view to providing mechanical resistance, and here special oils toughened by heat-treatment may be useful.

Other inhibitive primers besides red lead are now available, and those founded on metallic lead or lead alloy pigments have good inhibitive properties and a very small oil requirement. Chromates of zinc, barium and strontium are also used considerably, not only for iron but also for light alloys. The protective character of some inhibitive pigments appears to be reduced by the presence of chlorides and still more by the presence of hydrogen sulphide, matters of some importance in connection with ships, and deserving of more study than they have received.

The inhibitive properties of pigments such as red lead are only obtained if the inhibitor is laid very close to the metal. If separated from it by a mixture of mill-scale and rust, the inhibitive action may be lost. It is easy to protect steel which has been thoroughly freed from mill-scale by sand-blasting or pickling, or even steel from which the scale has peeled off completely as a result of exposure to the weather, and any trace of rust which remains shut under the paint seems to do little or no harm, provided painting is conducted in dry weather. But steel which has been exposed to the weather for a short time, so that small patches of the scale are removed, give very poor results when painted, even if the rust is removed by wire brushing, and if painted in this condition, the behavior of the paint is far worse than that of paint applied to steel with the scale intact.

For well understood electrochemical reasons, intense corrosion sets in at the breaks of the scale. The actual discolorization of the paint coat by rust may not necessarily proceed more rapidly than on a coat applied to a scale-free surface, but whereas on the latter the paint coat remains firm, and can usually be employed as a foundation for subsequent paint coats without scraping, the blistering and bulging of the paint-coat on a partially de-scaled surface leads to great difficulties when the time arrives for

repainting, and unless there is conscientious scraping or grinding, the fresh coats will start to fail rapidly.

(TO BE CONCLUDED IN NEXT ISSUE)

New Book on Gray Cast Iron

A NEW book entitled "Gray Cast Iron," by John W. Bolton, chief metallurgist and chemist of the Lunkenheimer Co., Cincinnati, is being published by the Penton Publishing Co., Cleveland. This work presents the basic metallurgical principles involved in the manufacture of gray iron to modern engineering specifications, and is intended for foundrymen, engineers, metallurgists and students. An effort is made to meet the requirements both of the non-technically trained reader and the research worker. Proved obsolete theories are ignored, but, on the other hand, when there are diverse opinions regarding interpretation of observed facts the opinions frequently are given.

Novel Crane Transfer System Speeds Fabrication

A NOVEL transfer system for moving loaded overhead cranes from one bay to another has been installed in the new Detroit plant of the American Blower Corp. This installation consists of four units—two of which are standard overhead travelers moving up and down the working bays, while the other two are transfers which travel at right angles across the ends of the building. Through ingenious arrangement, heavy machinery units in the process of fabrication in the main working bays are lifted by the overhead cranes which travel to the end of the runway where the entire cranes with their leads are picked up by the transfers traveling at right angles, and thus transferred to adjoining bays for the next steps in production.

The transfer cranes, both of 25-ton capacity, run at right angles to the bays at each end of the building. Suspended from the bottom of each is a section of runway, which, when locked into position, serves as a projected track and carrying attachment for the entire bay crane and its load. Moving along the end of the building, the transfer crane can be locked into position at the exact point where the carrier runway is aligned with

the main bay runway. With this accomplished, the runway end-stops are raised, permitting the entire crane to move off the transfer runway to the permanent bay runway.

This transfer system can easily be applied to as many bays as desired by extending the length of the transfer crane runway. The main bay cranes are P & H 5 and 10-ton capacity units, operating on runways 364 ft. long while the transfer cranes travel 120 ft. across the ends of the building. To take still further advantage of this system, depressed railroad tracks, running below and parallel with the transfer crane runways, facilitate loading and unloading of freight cars.

This installation is the result of collaboration between plant engineers of the American Blower Corp. and the consulting engineers, Albert Kahn, Inc., of Detroit, Mich. This crane system with interlocking details and wiring circuits to match properly the crane and transfer operations, was furnished by the overhead crane division of the Harnischfeger Corp., Milwaukee.

Armco and Allegheny Settle Patent Suits

THE American Rolling Mill Co. has licensed the Allegheny Steel Co. under its patents for continuous rolling of sheet and strip steel and the pending suit between the two companies has been dismissed. The Allegheny Steel Co.'s countersuit against the American Rolling Mill Co. on its patents relating to production of automobile sheets has also been dismissed and the American Rolling Mill Co. has taken over control of the patents involved in the countersuit.

Whitnall Conveyor & Mfg. Co., Whitewater, Wis., established in 1935, has increased its capitalization and its manufacturing facilities. H. E. Whitnall, formerly president of the Northern Conveyor & Mfg. Co., is vice-president of the company, in charge of sales, and P. H. Dorr, chairman of the board of the Shaler Company, Waupun, Wis., was recently elected president of the Whitnall company. The Whitnall conveyor, unloader and material handling line has been redesigned and augmented—an important change being effected by the extensive use of pressed steel, by pressed steel engineers experienced in the automotive field, which reduces weight and yet maintains rugged strength.